What Science? Who's Theology? A Reformed Theological Response to Andrew Newberg's Neurotheological Model

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Thesis presented in partial fulfilment of the requirements for the Degree of Master of Theology at the University of Stellenbosch

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March 2016

Declaration

I, the undersigned, Dubois du Toit, hereby declare that the work contained in this thesis is my own original work and it has not been submitted previously in its entirety or in part at any university or college for a degree.

Signature: Dubois du Toit

Date: March 2016

Abstract

Religious, mystical and spiritual experiences are some of the most important and complex experiential qualities of human life. It has always been our greatest endeavour to make sense of our reality, and these experiences have permeated our theories, analogies and theologies since the beginning. The rise of the modern scientific enterprise has given us access to previously unattainable perspectives and insights into just how significantly these experiences influence us on a psycho-somatic level. In no other field of study has this investigation seen more prominent development than in the neural sciences. Their studies and findings gave us the opportunity to engage our experiences critically, but researchers started asking questions regarding the experiences' causal nexus as well – where some even dismissed them as an evolutionary by-product of brain function. In reaction to this position, a new field of study emerged that endeavours to reconcile the scientific study and theology of these experiences, namely, neurotheology. Andrew Newberg, a proponent of neurotheology, is currently spearheading an attempt to establish neurotheology as a autonomous discipline. However, his perspectives on the goals, principles and neurological basis of a neurotheology raise some concern from both the scientific and theological communities.

Thus, it will be the task of this study to critically evaluate Newberg's neurotheology from different interactive perspectives, while focussing on the relevance of its contribution and possible relationship with regards to neuroscience and theology. In order to undertake this task it is necessary to provide a few frameworks which will be able to accommodate neurotheology, neuroscience and theology. An argument will be made for the specific use of a cognitive neuroscientific and critical reformed theological model with respect to the unique thrust of this study.

Opsomming

Godsdienstige, mistieke en spirituele ervaringe is van die belangrikste en mees komplekse ervarings-kwaliteite van die mensdom. Dit was nog altyd ons grootste strewe om sin te maak van ons werklikheid. Hierdie ervaringe het van die begin af ons teoretiese, analogiese en teologiese refleksies deurspek. Met die opkoms van die moderne wetenskap het ons toegang verkry tot voorheen verskuilde perspektiewe en insigte, tot hoe noemenswaardig die psigosomatiese impak van hierdie ervaringe op ons is. In geen ander studieveld het hierdie ondersoek meer prominente vooruitgang getoon as in die neurale wetenskappe nie. Hul studies en bevindings het ons die geleentheid gegee om krities om te gaan met ons ervaringe, maar die navorsers het begin vra na die kousaliteit hierin betrokke – dit het sommige gelei om die ervarings bloot te ontslaan as ’n byproduk van die brein se funksie. In reaksie hiertoe het ’n nuwe veld ontluik wat streef om die wetenskaplike studie en die teologie van hierdie ervaringe te versoen, naamlik, neuroteologie. Andrew Newberg, ’n voorstander van neuroteologie, is tans besig met ’n poging om neuroteologie te bevestig as ’n navorsingsveld uit eie reg. Sy perspektiewe op die doelstellings, beginsels en neurale begronding van neuroteologie het egter kommer gewek vanuit die wetenskaplike en teologiese gemeenskappe.

Dit sal dus die taak van hierdie studie wees om Newberg se neuroteologie krities te evalueer vanaf verskeie interaktiewe perspektiewe, terwyl daar gefokus word op die relevansie van sy bydrae en die moontlike verhouding ten opsigte van neurowetenskap en die teologie. Met die blik op hierdie onderneming sal dit nodig wees om ’n aantal raamwerke te voorsien wat in staat sal wees om neuroteologie, neurowetenskap en teologie te akkommodeer. ’n Argument sal gemaak word vir die spesifieke gebruik van ’n kognitiewe neurowetenskaplike en ’n kritiese gereformeerde teologiese model, met betrekking tot die unieke invalshoek van hierdie studie.

Acknowledgements

I am eternally indebted to every person that spoke a word of comfort or encouragement towards me, during the time I was writing this thesis. I specifically want to thank my wife for all the understanding and support – she has definitely been my greatest cheerleader. I would also like to thank my family – biological and in-laws – and friends, for their continued interest, patience and intercessory praying toward the completion of my studies.

A special note of thanks for the guidance, patience, motivation and insights I received from Dr. Dion Forster. He is truly an inspiration, and an unmistakable asset for theological scholarship at Stellenbosch University.

Lastly, and most importantly, I submit my everlasting gratitude to my Lord and Saviour, Jesus Christ; all I am, and have, and could ever hope to be is by His grace and mercy.

Table of Contents

Chapter 1 – General Introduction to the Study

1.1. Background and Rationale

With the abatement of the Cartesian-Newtonian worldview – especially due to the dawn of Einstein's relativity theory and Heisenberg's quantum uncertainty principle – science gradually started asking more and more elaborate ontological/metaphysical questions (Ward, 2006). The search for ultimate answers, ultimately led honest scientists away from a physically deterministic view of reality, toward an understanding and appreciation of complexity and higher order causality, and even the possibility of a transcendent *intelligence* or *mind* underlying our physical reality (cf. Ellis and Murphy, 1996). From the side of religion, a correlating inclination took place. The search for ultimate answers, led honest believers away from a fideistic/fundamentalist view and explanation of reality, with the realization that religion needs a stronger scientific as well as contextual grounding to come to its full right.

Thomas Kuhn, in his book, *The Structure of Scientific Revolutions* (1962), titled this phenomenon a "paradigm-shift" (1962:85). [1] A closer look at paradigm-theory elucidates this shift in terms of two main concepts and their constituents, i.e. quantitative[2]- and qualitative[3] research (Guba and Lincoln, 1994:105f). Although qualitative research initially functioned as a post-modern critique of the primacy of quantitative research in the early twentieth century, the latter is still considered

[1]Paradigm-shift: change in "a basic belief system based on ontological, epistemological, and methodological assumptions" – Guba and Lincoln, 1994:107

[2] Associated with inquiry conducted in what is known as the hard sciences: producing testable predictions, performing controlled experiments and relying on quantifiable data and mathematical models.

[3] Associated with inquiry conducted in what is known as the soft sciences: a method of inquiry employed in many different academic disciplines, traditionally in the social sciences, but also in market research and further contexts. Qualitative researchers aim to gather an in-depth understanding of human behaviour and the mechanisms that govern such behaviour.

the dominant paradigm for scientific inquiry today. It is also known as the positivist paradigm.

A very recent addition to paradigm-theory can be considered a synthesis between quantitative and qualitative research called *mixed method research*. "In general, mixed methods research represents research that involves collecting, analysing, and interpreting quantitative and qualitative data in a single study or in a series of studies that investigate the same underlying phenomenon" (Leech and Onwuegbuzie, 2009:265). The impetus of this third overarching paradigm, is the novelty created by the integration of quantitative and qualitative research – therein lies the distinction; it is a paradigm in its own right, and not dependent on the other two.

It is within this framework that researchers started to contemplate the nature and implications of physical and transcendent reality working with, and parallel to each other. One such field of research that recently began labouring to breach the quantitative-qualitative dualism, is cognitive neuroscience. This field of inquiry encapsulates neuropsychology, neurophysiology, neurophilosophy and, recently added to the list – the focus of this study – neurotheology[4] (cf. Brandt, 2010:305). Addressing the Neurotheological endeavour, Andrew Newberg and the late Eugene d'Aquili, among others – both pioneers in their respective fields of radiology and psychiatry – constructed a model for neurotheology, which, after the passing of d'Aquili, Newberg expanded upon (d'Aquili and Newberg – The Mystical Mind).

The claim made by means of this model, is that of an integration between neuroscience and both religious and transcendent experience in a single study. It is the hope of this neurotheological model – contending, in due course, that all religious, ritual and spiritual (RMS) experience has its basis in the functional interdependency of the mind and brain – that through it, a better understanding of these experiences will be facilitated.

The proposition made by Newberg's neurotheology, is that the meaning of all RMS experiences can be reworked – using neuropsychological and neurophysiological research as platform – into

[4] Neurotheology: referring to the study of religion – including myth-making, rituals, and the writing of theology – from a neuroscientific perspective.

an overall theological framework he terms a metatheology, which could ultimately lead to a megatheology (d'Aquili and Newberg, 1999:195ff).

1.2. Statement of the Problem

The problem that this research paper will address, pertains to the proposed integration of science and religion – specifically neuroscience and theology – by Andrew Newberg's model for neurotheology (d'Aquili & Newberg, 1999:4; Newberg, 2010:1). Utilizing this model, Newberg constructs a theoretical framework, wherein the distinct principles of both science and theology are, for lack of a better word, relativized. By arguing that the human mind is incapable of purely objective observations, he concludes that both the scientific and theological enterprises must use abstract metaphor to describe reality (d'Aquili et al. 2001:170-171).

It follows that quantitative measurements and objectivity – the core principles of empirical science – can be dropped in such a way that removes any inherent incompatibility science has with theology (Gilroy 2005:10). Conversely, with neurotheology's goal being to construct a meta- and megatheology,[5] unique *a priori* theological assumptions regarding RMS phenomena falls out of support, in favour of an *a posteriori* approach, implicating, to a large extent, religious universalism (cf. Brandt, 2010:305-306; Gilroy 2005:11). In other words, the focus is shifted from the transcendent to the concrete and measurable.

Choosing – contrary to the above mentioned invalidation of the distinctive principles of empirical science and theology – to acknowledge the integrity of both these enterprises in their own right, it would be necessary to explicate their individual fields of inquiry to ascertain the extent to which they can engage with Newberg's Neurotheological model – without having to make a paradigm-shift or be made subject to a universalistic view of reality (cf. Newberg, 2010:58).

[5] This is done by means of a neuropsychological and neurophysiological explanation of religion, traditional and doctrinal a priori theological assumptions.

1.3. Research Questions

In light of the problem statement, the aim of this research will be to answer the following three questions as responsibly as possible:

1. How, and to what extent, does cognitive neuroscience and critical reformed theology critique Andrew Newberg's neurotheological model?
2. Within which paradigm of inquiry is Andrew Newberg constructing his model for a neurotheological integration of science and religion? Is it predominantly quantitative (neuroscientifically orientated), qualitative (theologically orientated), or a seamlessly integrated mixed-method?
3. To what extent can neuroscience and reformed theology engage with neurotheology, without having to make a paradigm-shift?

1.4. Contribution and Relevance

In spite of all the critical reviews and engagement with Newberg's body of work, a paradigm's approach, has, to my knowledge, only ever been implied but never fully explicated, especially not from the perspective of Christian reformed theology. I believe that, by achieving the goal of this study – to lay bare the ontological, epistemological and methodological assumptions of neuroscience, reformed theology and neurotheology, as well as some of its esoteric characteristics – this research paper would be able to facilitate a framework for proper interaction between these three fields of research – as well as other scientific and theological enterprises – where the distinct principles of each need not be compromised.

1.5. Research Methodology and Goals

This research will be a non-empirical study (Mouton, 2001:57), mainly focussed on a review of relevant academic literature in neuroscience, theology, philosophy of religion and science, paradigms theory and neurotheology. The study will consist of a detailed analysis and disambiguation of concepts such as neurotheology, cognitive neuroscience, Christian reformed theology and paradigm-theory, to map them within a framework that can be used for evaluation

and theory construction.

It is the hope of this researcher that this study will be able to adequately articulate existing models for both cognitive neuroscience and reformed Christian Theology within their respective research paradigms. This will be done to test Andrew Newberg's model of neurotheology against these two models to ascertain if, and consequently how, integration and interaction is possible. The correlate will also be investigated, namely, if the religio-scientific synthesis proposed by Newberg's model is truly drawing upon proper empirical neuroscience, whilst doing justice to the religions implicated by his project, or if this synthesis is constructed out of a processed neuroscienctific and theological model in order to force the validity of his own neurotheology.

1.6. Structure of the Study

Chapter one will facilitate a general introduction to the subject matter as well as a very brief outline of the history of science and religion, delineating some of the background of the current debate, as well as where neurotheology fits into this scope.

Following the preliminary introduction to the subject matter, chapter two will be dedicated to giving an extensive, but not exhaustive, description of Andrew Newberg's model for neurotheology. Special focus will be placed upon what Newberg describes as the goals for neurotheology, what the guiding principles that gave rise to these goals are, and finally, what the neurological underpinnings of these principles entail.

For Newberg (2010:69), the point of departure for his neurotheological model, as well for its engagement with neuroscience and theology, is the *a priori* principle, that everything that can be thought of about the world is ultimately an assumption. This, he argues, is because of the brain producing a 'pre-processed' or 'second hand' view of reality. It is this principle that prevents any absolute or ultimate understanding of reality, at least, he argues, from a scientific perspective. His proposition for a way around this epistemological problem is exactly the experiential approach that his neurotheology facilitates, and therefore his commitment to the complementarity of neuroscience and theology within a neurotheological model.

Chapter three will be dedicated to delineating Andrej Jeftić's fourfold perspective on the different utilizations of, and engagement with neurotheology, namely, reductionist, religionist, apologetic and integrationist. A case will then be made as to where Newberg's project fits in. This will be the first of three frameworks within which Newberg's neurotheology will be placed, in order to relate it to neuroscience and theology trough a number of different fronts. The positive and negative reception of Newberg's neurotheology by the implicated communities will also be discussed in this chapter.

Here are some preliminary positive and negative engagement as a means of establishing a general perspective with regards to the rest of the study. Brandt (2010) examines the opportunities and challenges that neurotheology holds for religion and theology. His main arguments are, on the one hand, that the neuroscientific research into the functioning and the nature of the brain, seems to threaten traditional religious and theological assumptions, especially with regards to the soul and religious experience. On the other hand it provides previously unparalleled resources for the study of religion and theology, providing both scientific support for theological claims or resources for their development. It is Gilroy's (2005) contention that Newberg's work has enhanced the study of human spirituality, especially concerning ritual, myth, morality, mysticism and theology, by showing how these elements have been shaped by neurological and evolutionary factors. However, he proposes that a systematic inspection of Newberg's position suggests that his neuropsychology and neurotheology rely heavily on traditional philosophical underpinnings, which, to Gilroy's mind, are neither scientifically, nor theoretically adequate. He goes on to show how Newberg's mind/body position, as a hybrid of *dual aspect* and *epiphenomenalist* theories, fails to do justice to human freedom, individuality and mentality. Furthermore, he argues, Newberg's epistemology, which Gilroy coins a neurological Kantianism, does the same with objects, subjects, causality and time.[6]

Chapter four will give a general introduction to paradigm-theory and the most basic paradigms of inquiry, with regards to each of their distinctive ontologies, epistemologies and

[6] The technical terms will be disambiguated in chapter three.

methodologies. The difference between quantitative and qualitative research, in this respect, will also be explicated and discussed and brought into conversation with the mixed-method paradigm of inquiry. A case will then be made as to where Newberg's neurotheology fits into the spectrum. With this information, yet another point of reference is established from where to view the (possible) relationship between neurotheology, science and theology.

The rationale of this undertaking can be explained with reference to a few important authors. Kuhn (1962) contends that all scientific inquiry is conducted in certain paradigms that direct and inform the inquirer in terms of a certain view of reality (ontology), relationship to reality (epistemology) and methodology to acquire knowledge about reality. Paradigms can make shifts concerning these three fundamental positions when it becomes inadequate to explain certain phenomena. Barbour (1974) explains how models are constructed within certain paradigms, that give rise to theory, which can be tested against observation. It is when this ground level theory reveals too many anomalies in the assumptions of a given model or paradigm, that these shifts can occur. This view of scientific inquiry stands opposed to one of an endless linear accumulation of knowledge.

Guba (1990) and Guba & Lincoln (1994), delineates four fundamental paradigms of inquiry: positivism and postpositivism, critical theory and constructivism. Positivism and postpositivism are sided with quantitative research, while critical theory and constructivism are sided with qualitative theory. It seemed, for a long time, that this quantitative-qualitative dualism couldn't be breached, until a mixed method was proposed. Sale (et al. 2002) discusses this mixing of methods and concludes that it cannot be used for cross-validation or triangulation purposes, because the paradigms within which the different methods are conducted have a different view of reality and therefore a different view of the implicated phenomena. It is their recommendation that mixed method research be conducted for complementary purposes only.

Neurotheology, combining neuroscientific (quantitative) and theological (qualitative) research, could thus be considered as a mixed method research model and should be evaluated with regards to how well it operates within its own paradigmatic parameters, regarding its constituents.

The next chapter, five, will delineate Ian Barbour's fourfold view of possible interactions between science and religion. This chapter will also see the reformed theological and cognitive neuroscientific research fields saddled with a contemporary research model for theory forming. Then, together with Newberg's model, will be placed, respectively, within the framework of Barbour's four interaction models. The neuroscientific and theological models will also be given a place within the previous two frameworks, with the intention of triangulating an argument for the possible interactions between them and Newberg's neurotheology, from three different fronts.

For a basic orientation and frame of reference for the reader, here are some preliminary contouring of the theological and neuroscientific assumptions that will guide the overall discussion. Concerning a research model for theology, Van Huyssteen (1989), uses the phenomena of language – specifically the metaphorical foundation thereof – and the inherent experiential quality of reformed theology, to implicate the imperative of a critical-realist model for theory forming in systematic theology. Herein – over and against the positivistic theology he accuses Barth of – the continuity of reference between a pre-scientific language of faith, and theoretical theological language (dogma and doctrine) can be preserved. This means that the scriptural revelation of God is open for continual reinterpretation using responsible hermeneutics. He proposes that valid and relevant systematic theological theory forming need to adhere to the rational standards of a philosophy of science. He circumscribes a threefold criteria for a credible systematic theological thought-model: 1) the reality-involved essence of theological statements, 2) the critical and problem-solving ability of theological statements, 3) and the progressive and creative nature of theological statements.

Concerning a research model for neuroscience, Kandel et. al (2013), groups neuroscience within the scope of the biological sciences. The ultimate challenge for neuroscience, he contends, is to understand the biological basis of consciousness and the mental processes by which we perceive, act, learn and remember. By means of gene sequencing and the inference of amino acids, it has become possible to ascertain the specific function of cells, and produce a framework for all of cell biology, including cellular neurobiology. Utilizing this information, neuroscience is

endeavouring to achieve a unified scientific approach to the study of behaviour, following from the assumption that all behaviour is the result of brain function. This assumption effectively implicates consciousness as but a set of operations carried out by the brain. This model of inquiry correlates with what Guba (1990) identifies as post-positivistic. It conducts research based on observation and creates theory based on deduction and induction – a materialistic and largely reductionist model.

The final chapter will give a summary of everything that has been discussed throughout each chapter. This information will the be used in directly answering the three research questions posed within chapter one. A short description of what this researcher deems to be the limitations, as well as areas of further study, will also be given.

We shall now move on to a description of Andrew Newberg's neurotheology.

Chapter 2 – A Description of Andrew Newberg's Model for Neurotheology

2.1. Introduction

> We feel certain...that any specific theological idea may eventually be reducible to neuropsychological functions...[but] we do not feel in any way that a neuropsychological analysis of theology or mysticism alters their true spiritual and possibly transcendent nature. It merely indicates how human beings perceive these phenomena. - (d'Aquili & Newberg, 1999:175-176) [7]

It is difficult to distinguish Andrew Newberg's use of neuroscience and theology, with respect to neurotheology, from that of Eugene d'Aquili, when taking into account the collaborative nature of their earlier work. Their two mayor publications, *The Mystical Mind* (1999) and *Why God Won't Go Away* (2001), including related articles, could be considered the foundation for both their understandings of the scientific and theological constituents which comprises their neurotheology. In *The Mystical Mind*, they conducted their research in cooperation with Buddhist monks – during meditation – and French nuns – during prayer. This involved brain scanning (using the fMRI[8] method) that resulted in a unique neurological image of religious experience, which led them to conclude that what they had before them was "the photograph of God" (cf. Photograph of God? in d'Aquili et al. 2001)

[7] Eugene d'Aquili and Charles Laughlin, both pioneers in the field of neurotheology, first published "The Biopsychological Determinants of Religious Ritual Behaviour" in Zygon: The Journal of Religion and Science in 1975. Their thesis entails that all religious phenomenology arise from neuropsychology, but in a way that was much more complex than simple materialistic reduction (d'Aquili & Newberg, 1999:4)

[8] Functional magnetic resonance imaging uses magnetic fields and computers to generate images of the brain. It holds the advantage over other imaging techniques of a high resolution that can be accurate to 2-3 millimeters, thus it can be used to study parts of the brain that are only a few millimeters across (d'Aquili & Newberg, 1999:43).

Since the passing of d'Aquili, and given Newberg's recent solo publications: *How God Changes Your Brain* (2009), *The Principles of Neurotheology* (2010), *Words Can Change Your Brain* (2012) and *The Metaphysical Mind* (2013), it becomes easier to extrapolate his personal stance regarding neurotheology. The most fascinating of these is surely his Principles (2010), wherein he postulates the basic principles of any neurotheological endeavour, so as to establish it as an autonomous scientific discipline. There has been some negative reception of this work, but has also been positively compared in stature, by proponents such as Tiffany Demke, to Whitehead's *Process and Reality* (Zygon, 2011:763–764) - although, it has yet to be given the amount of consideration *The Mystical Mind* has received.

2.1.1. Newberg's Research Model Systematized

The point of departure for Newberg's model of neurotheology, as well for its engagement with neuroscience and theology, as is depicted in his *Principles* (2010:69), is the *a priori* principle, that everything that can be thought of about the world is ultimately an assumption (cf. d'Aquili et al. 1999:170-171). This, he argues, is because of the brain producing a "pre-processed" or "second hand" view of reality. It is this ontological principle that prevents any absolute or ultimate understanding of reality, at least, he argues, from a scientific perspective. His proposition for a way around the epistemological implications brought about by this problem, is exactly the experiential approach that his neurotheology facilitates. This approach also accounts for his commitment to the complementarity of neuroscience and theology.[9]

Furthermore, when it comes to neurotheological methodology, Newberg, by principle of rigor[10]

[9] Newberg builds upon Ian Barbour (1990) in this regard, who identifies four types of possible interaction between science and religion: (1) conflict, (2) mutual independence, (3) dialogue and (4) integration. These will be discussed in more detail in chapter five.

[10] While maintaining that rigor should be the overarching principle guiding neurotheological research, Newberg acknowledges that not all topics of study may be studied by using the same methods, as some methods are more commonly used in either traditional scientific or theological studies (Newberg,

and validity, fervently cautions against relying too heavily on scientific or theological biases when dealing with issues regarding the neurobiological correlates of spiritual beliefs and experiences (Newberg, 2010:145) – he reasons that neurotheology is not beholden to either science or theology, therefore, when doing neurotheology, no ontological priority should be given to either the material universe or to God. For Newberg, this field of study necessitates that there should be a possibility that scholarship might someday show, that either science or religion could be devoid of value (2010:45) – he adds, however, that a determination of this magnitude will be difficult if not impossible. Herein lies a question regarding the function of neurotheology, should this indeed prove possible: What happens to neurotheology when either religion or neuroscience falls away? Newberg explains (2010:61f) that, should religion ever be proven to be nothing more than a manifestation of the brains' functions, neurotheology could help to explain why, and contribute to modifying or even eliminate religion to accommodate the new information. Conversely, if it is unequivocally determined that a God exists, neurotheology would be able to assist in developing scientific methodologies that could accommodate such metaphysical empiricisms.

An extension of the methodology mentioned above, that features very prominently in *The Mystical Mind* (1999:195ff) as well, is the potential applicability of neurotheology as a meta- and megatheology, following from what Newberg calls a 'neurotheological hermeneutic.'[11] A Metatheology describes how and why foundational, creation, and soteriological doctrines are established, developed into complex logical systems, and expressed. A Megatheology contains content of such a general and universal nature, that it could be adopted by most, if not all, the

2010:68).

[11] A neurotheological hermeneutic follows from the philosophical standpoint that Newberg calls 'experientialism' (2010:86-87). This standpoint stems from the belief that all thinking, emotions and ideas are tied to human experience. These experiences are inherently implicated by the systemic working of the mind and brain and are reminiscent of the Kantian position that the external world can only be known through our perceptions and ideas.

world's great religions as a basic element, without any serious violation of their essential beliefs (2010:64-65). One reason for the potential of a neurotheological hermeneutic, in this regard, is that its basis rests on two universal elements – the human brain, and religion.

With the above in mind, and in want of a simple framework within which to place Newberg's neurotheology, this researcher endorses Andrej Jeftic's (2013:266) proposed two-level model for a systematized view of Newberg's research in neurotheology. Jeftic conducts this systemization with respect to the practical and theoretical implications of Newberg's research.

He divides the research within the practical sphere into two groups, each depending on the direction taken:

- One direction could be defined as going from religion towards neurology.

This approach starts from religious, spiritual and mystical experiences, in order to observe the impact these have on the functioning of the human brain, neural system and the entire individual as a psychosomatic entity.

- The other direction goes from neurology toward theology.

This approach examines the ways in which religious experience could be induced or enhanced by means of stimulation of certain neurological centres

Jeftic similarly divides the research within the theoretical level into two possible groups:

- One direction starts from neurology toward theology.

This, we have already mentioned, Newberg calls a neurotheological hermeneutic. This direction aims at showing the correlation between the brain centres and their activity on the one side, and the formation of theological (theoretical) concepts on the other.

- The other direction goes from theology to neurology.

This research direction seeks to enable theology to contribute to the neural sciences, by

developing certain theoretical concepts – such as mind and conscience – or by assisting the scientific endeavour in general, in finding answers to questions concerning the natural and supernatural world.

2.1.2. Chapter outline

We will regard the above is a brief and basic outline of the paradigmatic[12] underpinnings of Newberg's neurotheological model, both practical and theoretical. In order to understand how he arrived at such a perspective, as well as the implications thereof, it would be necessary to explore the three core elements that influences Newberg's thoughts on neurotheology. The remainder of this chapter will be dedicated to further explication of these elements:

Firstly, Newberg's formulation of the foundational goals of neurotheology. The question we want to answer here is: what does neurotheology want to accomplish, more specifically, what does Andrew Newberg want to accomplish with neurotheology? It is necessary to understand what he perceives the goals of neurotheology to be, in order to grasp how he develops and defends his model for it.

Secondly, Newberg's depiction of the foundational principles, underlying the goals of neurotheology. For the purpose of this research, 'principles' will be defined as "a fundamental truth or proposition that serves as the foundation for a system of belief or behaviour or for a chain of reasoning" (Merriam-Webster.com, Principle: 2014). By knowing what proponents of neurotheology are trying to accomplish through it, it becomes important to inquire as to what

[12] Guba and Lincoln (1994:107) defines a paradigm as a "set of basic beliefs (or metaphysics) that deals with ultimates or first principles." According to Guba (1990:18; cf. Guba & Lincoln, 1994:108), a paradigm of inquiry can be characterized by the way its proponents respond to three basic questions regarding: Ontology – What is the nature of the knowable/reality?; Epistemology – What is the nature between the knower (or inquirer) and the known (or knowable)?; and Methodology – How should the inquirer go about finding knowledge? The concept of paradigms, taking into account Newberg's neurotheology, will be developed further in Chapter 4.

guides them in this endeavour.

Thirdly, and explication of the neurophysiological and –psychological substructures Newberg uses to construct his principles for neurotheology will be presented. This element of Newberg's neurotheology is especially difficult to distinguish from that of d'Aquili, due to the empirical nature thereof, and the fact that this research was first circumscribed in their joint work, *The Mystical Mind* (1999). It is their aim to show that religious- and, in particular, mystical experiences, can be understood as a function of certain integrated processing units in the brain (Norman & Jeeves, 2010:242). They contend that the generation of such experiences is neither an epiphenomena of the functioning brain, nor due to any malfunction in the aforementioned processing systems, as certain researchers have proposed.[13]

The intention of this researcher, by elucidating these three fundamental elements, and taking into account the paradigmatic discussion and evaluation of the next chapter, is to show how an operational model of Newberg's neurotheology could be attained. A model of this kind would then be used, comparatively, against the chosen scientific and theological models, to ascertain the kind of assumptions Newberg has made regarding the science and theology incorporated within his neurotheology.

2.2. The Foundational Goals of Newberg's Neurotheology

Newberg makes a case for the necessity of developing neurotheology, and defending it as an autonomous field of research, by highlighting the fact that it may be able to provide answers to some very important questions, e.g. (2010:17):

- Neurotheology should be able to address many important issues pertaining to subjective experience, consciousness, the mind and the soul.

[13] Michael Persinger has ascribed these experiences to certain electrical events in the brain, especially the right temporal lobe, he calls 'Temporal lobe transients' (TLT's), which he likened to micro-seizures, more commonly known as epilepsy, without a motor component (Norman & Jeeves, 2010:241).

- It might bring new perspectives in the fields of theology and neuroscience.
- It may enhance certain fields that are contributing to its cross-disciplinary nature, e.g. anthropology, sociology, neurobiology, cognitive neuroscience, medicine, genetics, physics, philosophy, religious studies and theology.
- Finally, it could contribute to the integration of neuroscientific and religious or theological perspectives, which, in turn, would help to enhance our understanding of the above mentioned contributing fields.

In light of these possibilities and developing neurotheology as a research field, Newberg underlines four foundational goals. He stresses that scholarship in this area should be dedicated to (2010:17-20):

- improving our understanding of the human mind and brain
- improving our understanding of religion and theology
- improving the human condition, particularly in the context of health and wellbeing
- improving the human condition, particularly in the context of religion and spirituality.

These four goals can now be divided into two categories: the first two, Newberg explains, are meant to be both esoteric as well as pragmatic, regarding theological and scientific disciplines. The latter two goals refer to the importance of the application value of neurotheological findings, towards improving the human condition both individually and globally. These goals will now be explored in more detail.

Toward understanding the human mind and brain.

The field of cognitive neuroscience endeavours to link various aspects of human thought, feeling and perception to their biological correlates[14]. Neurotheology, as a field of collaborative

[14] Cunningham (2011:226), among others, however voices his concern regarding the localization of certain

research, utilizes these techniques and therewith challenges science to develop strong methodologies. The techniques used by cognitive neuroscience, have already advanced enormously over the past few decades, especially with the dawn of various brain imaging abilities and other techniques, to measure[15] the state of the brain during a variety of mental tasks and perceptions. The further development of these techniques, specifically in the study of religious and spiritual phenomena, will, according to Newberg, undoubtedly be the cornerstone for neurotheology in the future.

The methodological impact neurotheology has on cognitive neuroscience, is due to the fact that religious, mystical and spiritual (RMS)[16] phenomena are especially difficult to evaluate scientifically. Problems for any empirically based neurotheological research include, but are not limited to, 1) determining which subjects to study, 2) what should be measured biologically, phenomenologically or subjectively, 3) what approach is needed to make measurements and even 4) what measurements to make. To perform such studies in a manner that would yield useful results, Newberg stresses the importance of an improved or even reworked methodology in cognitive neuroscience, which he hopes will lead to a better overall understanding of the human brain. His methodology will be further explicated in chapter four.

In addition to contributing to the improvement of cognitive neuroscience methods, neurotheological research, according to Newberg, also provides new perspectives regarding the human mind. A study of one of the most pervasive dimensions of human life, viz religion and spirituality, should enhance our understanding of the human person greatly, as it relates to

types of behaviour to certain areas of the brain. Chapter 3 will elaborate on this topic.

[15] D'Aquili & Newberg (1999:42-43) provides an outline of the most functional methods of measurement as: Electro Encephalography (EEG), Computer Axial Tomography (CAT), Magnetic Resonance Imaging (MRI) and Single Photon Emission Computed Tomography (SPECT). See section 2.4.

[16] Murphy (1998:143) lists the following kinds of RMS experience: interpretive, revelatory, quasi-sensory, numinous, regenerative and mystical.

morality, love, honesty and other complex behaviourisms. The reason for these assumptions is, that the foundational elements of human cognition – especially pertaining to religiosity and spirituality, e.g., causality, teleology and epistemological arguments, are always challenging the human mind. Therefore, understanding the relationship between theology, as the product of the analysis of religion and spirituality (Newberg 2010:37) and these different elements of human cognition, neurotheology may significantly contribute to our understanding of the human brain.

Toward an understanding of religion and theology.

The inherent implication of this goal, is that theology has something to gain through its interactions with cognitive neuroscience. Newberg defends this notion, based upon what he views as the historical foundations of neurotheology. According to Newberg, a rudimentary neurotheology was already in practice through various cultural groups. These groups especially include the Upanishads. With their holistic understanding of the human person they could identify certain physical determinants for psychological health. In the same vein, some medieval theologians like Thomas Aquinas proposed that all healthy and rational action proceeds from a desire to achieve certain ends, to Paul Tillich defining systematic theology as that which pertains to "ultimate concerns" (2010:3ff). In all three these examples we find an understanding of physical action and expression, that alludes to something either epiphenomenal, teleological or psychological.

There is a concern, however, from the side of religion, that when using neurotheology to improve theology, in actuality theology will be replaced by a reductive, impersonal version of itself, using science[17]. Newberg, however, true to his principled, rigorous research methodology, discourages any attempt at such an undertaking.

[17] Proponents of a scientific reduction of theology and religion, attempts to account for all religious, spiritual and mystical phenomena by attributing it to evolutionary psychology (Beauregard & O'Leary, 2008:208), proposing that we as a species are genetically 'hardwired' to adhere to some form of religion. This topic will be elaborated further in the next chapter.

Toward improving the human condition, through health and wellbeing.

"Recent research has validated the multidimensional aspects of religious involvement, and investigated how religious factors operate through various bio-behavioral and psychosocial constructs, to affect health status through proposed mechanisms that link religion and health." (Chatters, 2000:335)

Flowing from the first goal – understanding the human mind and brain – a better understanding of the relationship between religion and the mind should ultimately yield information that will have practical application value, especially in the field of medicine and health. Since the 1970's, the term Holistic Medicine/Health became more and more commonplace (Holistic Medicine, 2013). The general philosophy behind this concept, is that human health need to be approached psychosomatically – physical, emotional, mental and spiritual elements are interconnected in maintaining health. Newberg (2010:63) stresses the possibility of neurotheology contributing to the development of a new integrated paradigm in healthcare and treatment, where all of these different elements will be taken into account. The implication of this integration, following studies in holistic health, might even include finding that certain spiritual practices, like meditation or prayer, may yield improvements in a variety of physical processes, including those related to the digestive-, cardiovascular- and immune systems (Newberg 2010:19).

Research has also been done on the possibility of the corollary, namely, the negative effects of religion. Newberg however points out that not much is known about the factors that lead to these negative perspectives. Yet, with the gift of hindsight, we have observed religion being used to justify hatred, prejudice and aggression. We have experienced religion being used to foster guilt and compliance, with the fear of evoking open criticism, being publically ostracized, and even put to death for certain transgressions (Williams & Sternthal, 2007:S48). Coping with these religious fears, have been proven to affect a person's health, and can contribute to illness. The ability to determine, neurotheologically, why hatred and exclusivity are condoned by religion, would certainly have important consequences for global health.

Toward improving the human condition through religion and spirituality.

The final goal propagates the possibility that the religious and spiritual wellbeing of individuals, and humanity in general, could be improved by neurotheology. The reason being, that this field of study might provide a context wherein the improved understanding of religious and theological phenomena may contribute to practical applications, in the ways in which spiritual goals are pursued by individuals (Newberg, 2010:20). The optimism of this goal rests on the principle at work, namely: whenever there is improved knowledge, especially when offering a new perspective, there is opportunity for growth. Religion and theology encourage spiritual growth, and thus, it is argued, neurotheology should be supported as any another mechanism by which such growth might be achieved.[18]

These are the four main goals that drive the neurotheological endeavour. We now move on to explore the guiding principles of this undertaking, as the means by which these goals are being achieved.

2.3. The Foundational Principles of Newberg's Neurotheology

The major areas of the neurotheological enterprise that Newberg deems necessary to be principled are, in the first instance, the area of interaction (playing field) between science and religion. When working with his definition of neurotheology, namely, "the activity of studying religious and spiritual phenomena in association with a cognitive neuroscientific perspective" (Newberg, 2010:51), it becomes imperative to provide guidelines that will insure an intellectual environment, where consonance between these two fields is made possible. For illustrative purposes, think of a sports field – it is a place where two different teams come together to engage in the same activity. The activity in this case being the study of spiritual and religious phenomena,

[18] Strong criticisms have been made on account of the mechanism by which neurotheology would bring about improved spiritual experiences, in order to facilitate spiritual growth. This will be discussed in the next chapter.

with the scientific and religious enterprise as the representative teams.

In the second instance, because of the very different natures of reflection within science and religion, an integrated methodology becomes a critically important matter – to extent the above mentioned illustration, we ask the question: what set of rules could be applied to both scientific and religious methodology to ensure that they may incorporate each other's perspectives in their respective fields? Pertaining to this issue, Newberg suggests that, although it might become necessary to sporadically operate within one distinct paradigm of inquiry (e.g. scientific or religious) to bring a certain research issue to its conclusion, the results may ultimately have implications for the other as well (2010:116).

These two challenges for neurotheology (interaction & methodology) will now be expounded further.

2.3.1. Levelling the playing field

Newberg introduces the fundamental principles for the neurotheological area of interaction between neuroscience and theology, by commenting and reflecting on Ian Barbour's (cf. Barbour, I.G. 2013) four types of scientific and religious interaction (Newberg, 2010:51ff):

Conflict

Implicated by the very term, neurotheology, Newberg explains that a relationship is necessitated, rather than an exclusionary approach. However, because of the fundamentally different foundations of science (generally a natural foundation) and religion (generally a supernatural foundation), neurotheology must acknowledge the potential for conflict between these two fields of inquiry. Of course, according to Newberg, religions also have a keen interest in the natural world as it pertains to humanity and human endeavour. For that reason, science might be perceived as best relating to the immanence of God in the natural world.

Conversely, since religion is based on the supernatural, it falls outside of the scope of science's paradigmatic approach. However, science might have an ardent interest in the way religions view human beings, human behaviour and human involvement in this world – hence the existence of

the science of religion or the scientific study of religions disciplines.

Newberg tasks neurotheology in this regard with understanding the nature of the conflict between science and religion, by focusing on the nature of the human mind/brain as the mediator of this conflict. A prominent component of the brain's processing system, that will be discussed under section 2.4, is the binary operator, that needs to allow one of two seeming opposite concepts to take precedence over the other on a perceptual, cognitive or emotional level. Thus, the task of neurotheology would be to understand why the human mind/brain would strive to support an oppositional perspective between scientific and religious ideologies.

Mutual independence

Stephen Jay Gould, in a 1997 essay for Natural History magazine (1997:16-22), and later in his book, Rocks of Ages (1999), proposed what he described as "a blessedly simple and entirely conventional resolution to ... the supposed conflict between science and religion" – Non-Overlapping Magisteria. In some ways, this stance is not unlike the first, although it lacks the antagonistic perspective described above. This notion implies that, at their core, science and religion are such fundamentally different approaches to reality, that they cannot hope to address the same topics.

Neurotheology, Newberg argues, would, similar to the first approach, have trouble with this kind of interaction between science and religion. He propagates that there are many potential areas of overlap. Keeping this in mind, he argues, neurotheology should still be driven to evaluate this kind of relationship until it is definitively proven that non-overlapping magisteria actually exist, whilst remaining open to the possibility of a fully integrated interaction between science and religion.

Dialogue

Neurotheology has more in common with this third type of scientific and theological interaction; the reason for this is already implied in the term 'neurotheology'. It is at this stage of his argument in his Principles that Newberg introduces the next principle for any neurotheological endeavour:

dialogue. He argues that, as an academic discipline, neurotheology should strive to nurture dialogue between science and religion in order to better understand both perspectives.

To further expound on this principle, Newberg stresses the need to explore the actual nature of the dialogue as well; with such queries including, but not being limited to:

- Discerning the importance of perceptions, emotions and cognitions within the dialogue, how some of these elements prevent certain people from partaking in the dialogue, as well as how such barriers could be overcome, while asking if indeed they should be overcome.

- Which religious ideas or beliefs are most favourable or unfavourable to be brought into the dialogue?

- If dialogue implies language, which fundamental language is most appropriate, e.g. philosophy, theology, anthropology, science or a hybrid of some kind?

- How to accommodate scientific research and sacred texts in the dialogue.

Whilst being fully aware of all types of interaction between science and religion, and even embracing these interactions as part of the overall goal of neurotheology, it is the principle interaction of *integration*, for Newberg, which represents the core of the neurotheological endeavour. It is this conviction that leads him to elaborate on his next, and very important neurotheological principle (2010:54), i.e. that "Neuroscientific and theological perspectives must be considered to be comparable contributors to neurotheological investigations."

Although some arguments and investigations will undeniably be slanted toward neuroscience or theology, Newberg argues that both perspectives should have similar and reciprocal prominence in the overall debate. For example, when analysing sacred and religious texts, the emphasis would primarily fall toward a theological interpretation thereof, with little assistance from neuroscience. On the other hand, when dealing with a study exploring brain changes during a particular religious experience, the emphasis would rather be centred around a neuroscientific methodology.

With this in mind, an ongoing challenge and an area of major neurotheological discordance, regarding the scientific and religious interaction prominent therein, Newberg argues, comes from trying to determine the direction of the causal arrow (2010:54). To explain this he uses the example of a study that utilises an MRI scan on nuns, while they are having the experience of being in the presence of God. If, during the study, it is found that there are specific changes in brain activity, it could be argued that either the activity in the brain caused these experiences to occur, or that the brain spontaneously responded to the experience of the subjects actually being in God's presence. The reality, in fact, is the scan can only point out that there is a link between the experience and the brain activity, nothing more.

Thus, Newberg warns neurotheological scholarship not to give God or the material universe causal priority, *a priori* – weary of the possibility of reverting to theological or scientific reductionism (d'Aquili & Newberg, 1999:175) – but rather to consider their causal relationship, and determining the causal priority, a posteriori – if, indeed, it ever proves possible to do so.

2.3.2. The Rules of Engagement

Having carefully constructed a neurotheological area of interaction – wherein a possible integration of neuroscientific and theological contributions could be achieved in the study of religious and spiritual phenomena – Newberg suggests a methodology (or 'rules' if we keep to the initial illustration) that takes into account, four distinct research dimensions.

- Appropriate measures and definitions of Spirituality and Religiousness
- Subject selection and comparison groups
- Study design and biostatistics
- Theological and epistemological implications

These four dimensions are specifically aimed at facilitating the desired principle of unbiased integration between neuroscience and theology. Newberg strives to achieve this by configuring his methodology in such a way as to support both practical and esoteric goals of scientific and

theological scholarship, but also petitioning these two fields of research to allow for new methods, concepts and conclusions to arise from neurotheological scholarship. Important elements of the aforementioned research dimensions will now be expounded upon briefly (Newberg 2010:116ff):

Newberg divides the issue of measurement within Neuroscientific studies into the categories of Subjective measures and objective measures.

Subjective measures.

This element of the scientific study of religious/spiritual experience is deemed most important. The reason being, that if any neurophysical of psychological change takes place during a study, it is critical to know the specifics of what the individual partaking in the study actually experienced – so as to acquire quantifiable data. The difficulties of this kind of study arise when comparisons need to be made, especially when distinguishing between what individuals experience as spiritual or religious, as well as how these experiences differ between various cultures and religions.

To elaborate on this: a certain kind of physiological experience could be shared by, for example, a Catholic, Jew, Islamist and Buddhist. The Catholic may describe the experience as a sense of connection to Jesus Christ, the Jew may describe it as an apparent connection to God Almighty, an Islamist to Allah, and the Buddhist to the Ultimate reality of the Universe.

In this regard, Newberg stresses the need for appropriate scales to measure and place an individual's spirituality. These scales usually come in the form of questionnaires to extract applicable information from the individuals partaking in the study.[19] Newberg then proceeds to expound upon a number of problems and provisions that need to be taken into account when using scales for neurotheological study, relating to the definition of certain concepts and how the understanding of these concepts vary across religions and cultures. He concludes that any scale must be adequate enough to measure what it claims to measure, be broad enough to include a

[19] The weaknesses of such a methodological approach will be discussed in chapter three.

satisfactory array of spiritualties, but narrow enough to be measurable, utilising unambiguous definitions appropriate for the context and the individual it is being used on (Newberg, 2010:120).

Objective measures.

"…mystical experience is biologically, observably, and scientifically real."- (Newberg et al. 2008)

A vast assortment of approaches and techniques are currently available for measuring religious and spiritual phenomena, by studying the brain objectively. Some approaches directly image physiological changes in metabolism, blood flow or neurotransmitter activity – as briefly named under 2.2 – others, more indirectly, measure changes in the bloodstream and body. The reason for the latter type of measurement being, Newberg asserts, that recent studies have shown correlations between certain practices, like meditation and prayer, and changes in blood pressure and heart rate (cf. Newberg et al., 2003; Newberg et al., 2006; Peres et al., 2012).

Sadly, there are a few major problems affronting the ability to interpret data from all functional brain imaging studies. The most prominent of which, is how the subjective experience, actually relates to what is being measured physiologically (and vice versa). In effect it begs the question of the causal relationship between brain processes and the subjective experiences. This brings us to the next topic:

Theological and epistemological implications

At issue here is that brain scans might be unable to distinguish between the brain creating an experience, on the one hand, and the brain responding to an experience, on the other. Furthermore, in line with what has been noted at the beginning of this chapter, Newberg posits that everything a person perceives are subject to the internal processes of the brain. This problematizes differentiating between any external objects, and their representations within the brain.

Two main research paradigms have been designed to address the subjective-objective problem, as well as that of causality. The fist, this paper will briefly explain, is pharmacological induction

and altering of spiritual phenomena. This study would aim to ascertain whether a pharmacological agent could induce some kind of spiritual experience. Alternatively measurements taken from previous spiritual experiences would be compared to those conducted on subjects given pharmacological agents, to ascertain the level of influence thereof.[20]

It is possible to conceive that studies of this kind may have a major impact upon the discussion surrounding the causal arrow. They may bend it toward more materialistic and reductionist explanations of spiritual and religious experience – however, Newberg stresses that the use of psychotropic substances to alter or induce these kind of experiences does not necessarily eliminate a spiritual dimension thereof. He appeals to the Shamanic and Native American Indian groups that have been using psychotropic compounds for thousands of years to induce spiritual states. He argues that the pretext for their use of psychotropic assistance is merely that it opens the mind to the spiritual realm.

The second research paradigm used within this same field of study resides in the examination of neuropathologic and psychopathologic spiritual experiences. This study, Newberg explains, deals with alterations of religious experiences, brought about by neurological conditions –seizure disorders, brain tumours in the temporal lobes and stroke – as well as psychiatric disorders known to have been associated with spiritual and religious experiences – such as schizophrenia and mania. Newberg delineates that, knowing the kind of pathology and its location within the brain, certain neurobiological substrates of spiritual experience can be identified.

The significance of the study of neuropathologic and psychopathologic spiritual experiences lies within the possibility of elucidating the neurobiological systems that undergirds what has come to be known as “normal” spiritual experience. In this regard it is Newberg that warns his peers to take care in defining and differentiating between what can be called “normal” or “abnormal”

[20] Two relatively recent studies by Johns Griffiths et. al (2008) and Carhart-Harris et. al (2012), respectively, showed that administering psilocybin, a.o., results in powerful experiences that have frequently been described in spiritual terms.

experiences. The danger, he states, comes when attempting to over-pathologize such experiences inappropriately (Newberg 2010:126ff).

Having briefly described Newberg's foundational principles and parameters for the interaction between neuroscience and religion, we now turn to the neurophysiological and –psychological underpinnings that motivates his case for complementary interaction between these two fields of study.

2.4. The Neurophysiological and Neuropsychological underpinnings of Newberg's Model

"In The Mystical Mind, Eugene d'Aquili and Andrew Newberg aim to show that religious experience and, in particular, mystical experiences, can be understood as the outcome of the integrated functioning of specific processing units in the brain. The generation of such experiences is neither the result of malfunctioning in these systems nor is it an epiphenomena of brain functioning. Rather, it is a primary function of these systems, working together, to generate religious experiences." - (Norman & Jeeves, 2010:242)

The model used by Newberg, in collaboration with the late Eugene d'Aquili, to explain mystical experiences as they relate to the mind and brain, is based upon the functioning of the following neurobiological and -psychological elements: a twofold division of the autonomic nervous system (one arousing, the other quiescent), portions of the limbic system (especially the amygdala and hippocampus) and the four tertiary association areas of the neocortex (Visual, Orientation, Attention and Verbal-Conceptual association areas). Psychologically, Newberg and d'Aquili focus on seven different cognitive operators (the holistic, reductionist, causal, abstractive, binary, quantitative, and emotional value operators) which are deemed the primary functional components of different parts of the brain. Additionally a process of deafferentation can inhibit incoming information to certain components of the cognitive system in certain situations, prompting these systems to operate according to its own internal logic, bringing about interesting experiences.

The scope of this study would not permit the researcher to fully describe each of the mind/brain components, or the entire scope of the religious implications drawn from studies regarding the above mentioned elements and phenomena therein. Suffice it to say, that, as will be shown briefly, the driving force behind d'Aquili and Newberg's neurotheology, are their understanding of the functioning of the perceived biological en psychological correlates of religious and spiritual experience. A brief description of the most important of the above elements will now be given, with some of the religious implications they incite.

The twofold division of the autonomic nervous system (ANS):

In their joint publication, The Mystical Mind (1999), Newberg and d'Aquili describes the ANS as the most basic part of human cognitive processes (p.23f). This system helps to connect the brain to the rest of the body, and assists in generating the most fundamental emotions, such as fear, joy and shame.

The ANS can further be subdivided into two systems (cf. Kandel et al. 2013:337ff; Newberg & d'Aquili 2008): the sympathetic/arousal system – which promotes the active 'fight-or-flight'-response[21] - and the parasympathetic/quiescence system – more passively promoting homeostasis and the conservation of the body's resources and energy. These two systems usually have an inhibitory function toward each other (d'Aquili & Newberg, 1999:24), preventing excessive activity in either system. Studies have shown that under certain circumstances of maximal stimulation in one system, a spill-over effect may occur, resulting in an activation response (rather than inhibitory) from the opposite system. This is a very rare state that causes the two systems to function simultaneously.

D'Aquili and Newberg propose five basic categories of the arousal/quiescent states that may occur during phases of extraordinary consciousness (op. cit., p.25).

[21] This is a short-range baseline physiological response to either desirable or noxious stimuli in the environment (d'Aquili & Newberg, 1999:23).

- The Hyperquiescent State: During this state quiescent activity is exceptionally high, bringing about extreme relaxation. Activities commonly associated with this state include normal sleep and 'slow' ritualistic behaviour such as prayer or chanting – as opposed to frenzied or rapid behaviour.

- The Hyperarousal State: During this state arousal activity is exceptionally high, resulting in an extraordinary sense of arousal or excitation. Commonly associated with this state are motor activities that tend to be continuous and rhythmic, such as ritualistic dancing and long-distance running, or swimming.

- The Hyperquiescent State with Eruption of the Arousal System: The spill-over function takes effect due to extreme quiescent activity, activating the arousal system. Studies have shown subjects experiencing this phenomenon to undergo a great sense of bliss, accompanied by a feeling of a tremendous release of energy.

- The Hyperarousal State with Eruption of the Quiescent System (op. cit., p.26): The spill-over function takes effect in the opposite route as described above, whereby the quiescent system becomes active during hyperarousal. A subject may experience an orgasmic, rapturous or ecstatic rush, with the spill-over bringing about a trance-like state.

- Simultaneous Maximal Discharge: This is the state triggered when both the arousal and quiescent systems reach their maximum capacity. "There is evidence that this occurs during the state in which there is a complete breakdown of any discrete boundaries between objects, a sense of the absence of time, and the elimination of the self-other dichotomy" (d'Aquili & Newberg, 1999:26). This state could be related to such religious experiences as unio mystica, Nirvana, or similar unitary states.

Deafferentation:

Deafferentation is the process by which incoming afferents (information) into a certain brain structure are cut off, or blocked, causing the neurons of the locale in question to start firing on their own, based on the internal logic of its evolutionary function (op. cit., p.41f). This process

can come about by physical interruption, such as a tumour, or by surgery, or functional deafferentation. The latter type occurs when fibres with an inhibitory function block the transmission of information between brain structures (d'Aquili & Newberg, 1999:41-42).

D'Aquili and Newberg gives an example of the types of experiences that might accompany total, or near total deafferentation. When a brain structure like the orientation association area – the area that receives input from the sensory areas to create a sense of space and time – would become deafferentated, it still works according to its own internal logic and could create a sense of no time or space, or infinite time and space. According to them, a great number of the world's mystical literature describes this experience, possibly induced by deafferentation.

The cognitive operators:

The cognitive operators are known as the "primary functional components of the mind" (d'Aquili & Newberg, 1999:50), which are linked to specific parts of the brain. Certain mathematical qualities could be ascribed to these operators, as they function by relating elements to each other. A simple example would be to multiply (x) 2 with 4. The operator in this case being the 'x' and the elements to be related to one another the 2 and 4. Naturally, cognitive operators are far more advanced than simple mathematics, with elements being related to one another, for example, by sensory perception, emotion and thoughts. It is the complex and integrated functioning of the cognitive operators that produce a sense of mind. It is also important to note that these operators' basic functioning and anatomical correlates are basically the same for all people – prompting the assumption that this function of the brain must be genetically pre-programmed into the human genome (d'Aquili & Newberg, 1999:50f).

D'Aquili and Newberg (op. cit., 51f) identifies seven primary cognitive operators. They comprise of the most basic functions of the mind, by which the mind are allowed to think, order, interpret, feel and experience the universe:

1. The holistic operator – This operator allows us to view reality as a whole, to place any given experience within a more global context. With regards to religion, this operator might allow us to understand the unity of God, or the oneness of the universe.

2. The reductionist operator – This operator can be considered the antithesis of the holistic operator, allowing us to analyse the individual pieces that made up a whole. Humans probably get their scientific, logical and mathematical capabilities from this operator. The interaction of the reductionist and holistic operators are crucially important for our most accurate understanding of the universe.

3. The causal operator – Through this operator, humans view reality in terms of causal sequences – prompting us to ask why something is the way it is. This function of the brain is also called the causal imperative – driving human beings to search out causes and eventually toward formulating first causes, so as to close the causal loop. This is an especially important function of thought for disciplines such as science, philosophy and religion.

4. The abstractive operator – Playing a great part in the language function of the brain, the abstractive operator forms general concepts from individual facts, e.g., to collectively classify Chardonnay, Bordeaux and Sauvignon Blanc as wine. Furthermore this operator can formulate a unified abstract concept of two individual facts, such as can be found within scientific theories, philosophical assumptions and religious doctrine.

5. The binary operator – This operator extracts meaning from the world by ordering abstract elements into dyads,[22] e.g., good and evil, right and wrong, happy and sad, heaven and hell. It is often the case that these opposing/contrasting elements need each other to be fully understood or defined. By looking at the examples given, it is obvious that the binary operator has a central role to play in the creation of myth.

6. The quantitative operator – The ability to abstract quantity from a variety of elements is a function of the quantitative operator. This enables humans to order their surroundings based on a numbering system, or the estimation of amount.

[22] Dyads: something that consists of two opposing elements or parts.

7. The emotional value operator – This operator prompts the assignment of certain emotional values to various elements of perception and cognition – enabling the ability to evaluate and respond to our perceptions. The function of this operator is paramount in the development of culture, society and belief systems. Because the emotional operator needs to assign emotional value to the responses of all the other operators, it truly needs the most complex brain functioning of them all.

"The cognitive operators represent the way that the mind functions on all input into the brain" (d'Aquili & Newberg, 1999:57). These operators originate within the brain, but their function – the way they respond to external input – should be understood as the working of the mind. The mind and brain cannot be separated from each other. As the brain represents the structural/physiological aspects of the mind, the mind represents the functional/psychological aspects of the brain. d'Aquili and Newberg termed the phrase "mystical mind" (d'Aquili & Newberg, 1999:47) based upon the myriad of complex interactions by the various components of mind and brain, which, for them, established the possibility of the brain being genetically hardwired to facilitate religious and spiritual experiences.

2.5. Conclusion

This chapter has charted a basic outline for Newberg's neurotheological model, which could now be scrutinized in the chapters that follow. It has elaborated on Newberg's ontological view off reality – reality is out there, it can be found out. It has also described his epistemology – everything that can be thought of about the world is ultimately an assumption; prompting an unbiased engagement with reality on these grounds. This brings us to his methodology, utilizing the neurological hermeneutic, characterized by the overarching principle of rigor to differentiate between the best methods for a specific topic of study, be it more a traditionally scientific or theological methodology – this position can be termed pragmatist and will be elaborated on in chapter four.

It is refreshing to witness Newberg's attempt at following his neurotheological hermeneutic where ever it may lead (this researcher's own termonology) – to be committed to the possibility

of a total dismantling or grounding of either theology or neuroscience on the basis of unbiased research. The next chapter will discuss the measure with which his research succeeds or falls short on these terms.

With regards to the goals of Newberg's model for neurotheology, it seems quite clear that he endeavours to establish a framework for understanding RMS experiences and impulses. This is done in such a manner that it would benefit and enlighten both, people looking at the model from a purely scientific or purely religious viewpoint – elucidating the neurobiological and neuropsychological elements for scientists, and interpreting the RMS experience for the practitioner with reference to Newberg's meta- or megatheology.

By concluding this chapter with a basic outline of Newberg's neurotheological model, it behoves the researcher to place it within the framework of other models to realise Newberg's unique thrust in this regard. Thus, the next chapter will be dedicated to describing the four basic forms of engagement with neurotheology and their main proponents, as well as where Newberg's model would feature in this broader framework. A critical engagement with Newberg's neurotheology will also be conducted.

Chapter 3 – Engaging Neurotheology

3.1. Introduction

"The Astonishing Hypothesis is that 'you' – your joys and your sorrows, your memories and ambitions, your sense of personal identity and free will – are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules"- Francis Crick (1994)

Pierre-Yves Brandt (Brandt et. al., 2010:305), describes Neuroscience as both a challenge and opportunity for religion and theology. On the one hand, he explains, it seems that the neuroscientific endeavour of researching the nature and functioning of the human brain threatens traditional theological and religious notions, specifically regarding the human soul and genuine religious experience. [23] On the other hand, it seems as though advancements in neuroscience are offering previously unequalled resources for the study of religion and religious behaviour, while simultaneously providing valuable scientific support for theological claims and furthering their development.

Much like Jeftic's 'directional analogy' (2013) described in the previous chapter, Brandt et al. (2010:305) identifies two fundamental ways in which Neurotheology can be thought off: [24]

- Firstly Neurotheology can be thought of as a branch of Neuroscience, in which the focus

[23] Jeftic (2013:276) puts it to neurotheology, that to "explain all religious phenomena, both practical and theoretical, through the prism of experience" is doing an injustice to the complexity of religious phenomena, as well as the views its proponents hold.

[24] Blume (2011:307) cautions us to remain mindful of the numerous different and overlapping perspectives toward Neurotheology from the research fields involved. These fields range from paleo-archaeology through psychology and medical studies, with differing foci ranging from the individual brain to social and cultural interactions. Research are also being conducted using diverse vantage points, such as the defining of concepts (e.g. 'religion'), experiences, or behaviours to name but a few.

is on the neuroscientific study of religious phenomena.

- Secondly Neurotheology can be thought of as a branch of Theology, in which the impetus rests upon neurologically informed theological reflection.

Furthermore, Brandt states, a few distinctions can be made within these main types. A neuroscientific approach to religion can be divided into reductionist and religionist schools (Brandt et. al., 2010:306; cf. Feit, 2003:22-25). In the same vein, a theological approach to the neurosciences can be divided into an apologetic or integrative stance.

This chapter will be dedicated to exploring these subdivisions, their proponents and the subsequent dynamic engagement they have with Neurotheology. The goal is to move on from the previous chapter's description of what Neurotheology is, particularly Andrew Newberg's model thereof, towards delineating the diverse range of interaction between neuroscience and Neurotheology, and theology and Neurotheology, placing Newberg's model somewhere within this range.

3.2. Science and Neurotheology

3.2.1. Reductionist view

The principles of neuroscience assume and predict that all experiences are generated by brain activity as a consequence of structural patterns. A convergence of methodologies and measurements indicate that religious/mystical experiences and beliefs associated with them are predictable phenomena (Persinger et al. 2010)

Brandt et al. (2010:306) describes the reductive neuroscience of religion as aiming "to disprove the reality or importance of religion and to replace it with non-mysterious neurological functions (or malfunctions)', in other words, explaining typical religious and mystical experiences as simple brain functions taking place under certain circumstances (Du Toit, 2007:227). One of the most prominent proponents of this specific view is Michael Persinger.

Inherent in his reductive neurological model, as well as those of like-minded scholars, are the

basic principle of neural-structuralism (Persinger, 2001:515 & 2010:432)[25], which enables the researcher to localise certain functions of the mind and brain. [26] The main conviction of neural-structuralism is that, through an appropriate and thorough study of the brain, neuroscientists would be able to predict phenomena associated with certain genes, chemical make-up (Muller, 2008:3), or areas of the brain (cf. Ramachandran et al. 1997).[27]

In terms of religion, the structuralists views 'God' as a term simply given to an imaginary external cause of certain sentiments and sensations. It is argued that these experiences are no more that neurological accidents (cf. Persinger, 1987 & 2001). The domain of the 'religious' is consequently considered as an evolutionary by-product or neurological epiphenomenon. Generated or projected by the brain, the 'religious' explains away the causes of certain mental activities, which generally perplexes the conscious brain (cf. Brandt et al., 2010:306).

The mechanism by which these 'religious' experiences are born, Persinger argues, are 'epileptiform micro-seizures' focussed in the temporal lobes, specifically the amygdala and hippocampus. The seizures are triggered by stress-related chemical states, such as hypoglycaemia, hypoxia or fatigue. Furthermore, according to Persinger (2001), these micro-seizures can have an emotional function – both positive and negative – as it may induce feelings of peacefulness and meaningfulness on the one hand, and anxiety and fear on the other.

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[25] This model may also be called 'materialist', as it is argued that all mental processes can "ultimately be accounted for by a few basic physical laws" (Muller, 2008:3)

[26] In the latter half of the 20th century there has been a considerable amount of researchers proposing the existence of a 'God spot', 'God gene' or 'God circuit' in the brain (Graham, 2014). Ramachandran (1998), for example, proposed that the brain's amygdala may by the source of all religious experience.

[27] There has been a sizeable amount of researchers warning against reductionism, imploring the the neurosciences to take the whole person in it's environment and different contexts into account. It is argued that such is the nature of complex systems and that the human person embodies 'ultimate biological complexity' (Du Toit, 2007:276)

According to Brandt (2010:306), structuralists, like Persinger, are proponents of an evolutionary origin – and thus it had an important survival function (cf. Inzlicht et al., 2009) – to what they deem incorporates 'religious experiences'.[28] Atran (2002, in McNamara, 2006:182) defined religion in terms of this perspective as "...a converging by-product of several cognitive and emotional mechanisms that evolved under natural selection for mundane adaptive tasks." In the same vein, Boyer and Bergstrom (2008:111) asks the question whether the health and fitness benefits of religious practices could further bolster the argument from an evolutionary standpoint (cf. Williams & Sternthal, 2007:2001).

In conclusion, it is clear that the main thrust of the structuralist, or reductionist view of neuroscience, is to explain religion by establishing it's neurological underpinnings – in other words, reducing religion to a natural phenomenon (Dennett, 2007).

One famous experiment conducted in an attempt to validate the claim of the reductionist school was Persinger's 'God helmet' (cf. Cooke et al., 2013:3). This helmet used low voltage electromagnets to stimulate the temporal lobes, by generating an electrical field rotating horizontally. A double-blind study indicated that subjects exposed to these electrical stimulus experienced something akin to what they would describe as RMS. The researchers interpreted the results as evidence that the temporal lobes may well be the sources of all RMS experiences. The reductionist school built upon these studies by attempting to further localise higher brain functions such as religion, emotion, language, etc.

[28] It is argued, for example, that God-experiences during life-threatening events assisted in the disappearance of fear and a readiness to die.

3.2.2. Religionist view

> Brain-Mind studies can help religious people to understand their religious experiences. The Theological emphasis on the human person as an interrelated unity will help to obviate reductive and simplistic approaches in the neurology debate (Du Toit, 2007:279).

In contrast to the reductionist view, although still concerned with contouring the neurobiological substrates of religious phenomena, is to indicate the the authenticity of religious consciousness (Brandt et al., 2010:306) by demonstrating that religious phenomena are accompanied by a genuine neural occurrence.

In practice, this view is premised upon the observations of brain-state changes during RMS practices such as meditation and prayer, using SPECT scans. In contrast to the reductionist view, proponents of this stance argue, that RMS experiences are irreducible to other neurological states. Thus, in a somewhat apologetic fashion, religionists reason that these experiences are not the product of "distraught or dysfunctional minds and cannot be explained away as the results of epileptiform seizures or psychotic hallucinations" (Brandt et al., 2010:306).

D'Aquili and Newberg are generally accepted as the main protagonists of this view (Brandt et al., 2010:306). Although the religionist school propagates an authentic scientific understanding of religion, some theology is lost or relativized in the process. The point of departure in this regard, is that theology can be described as mostly unscientific and therefore needs to be replaced by the new discipline of Neurotheology – scientifically informed theology. Charlene Burns (2012:308) gives an appropriate description of this view of Neurotheology as 'theology without theologian.'

There will be a more thorough engagement with Newberg's work and Neurotheological nuances toward the end of this chapter to better place them on the spectrum of the four different views.

3.2.3. Conclusion

At this point it is important to distinguish clearly between the reductionist and religionist view.

The most prominent difference, evident in the outline above, is on account of their respective assumptions about, metaphysics and anthropology, among others.

The reductionist school has no regard for any authenticity in RMS experiences, in effect, these experiences are irrelevant to their view of reality, except as objects of scrutiny – there are no mysterious origin to these experiences. The religionist school, although conservative enough not to allocate an external causality to RMS phenomena outright, does consider them to have an origin not entirely so non-mysterious as made out by the reductionists. As pertaining to anthropology, the religionist approach tends to cultivate a more holistic view of the human person as a psycho-somatic being , as opposed to the mechanistic view of the reductionists. These assumptions are evident in their respective methodologies, and can be expected to exercise a measure of divergent influence on their epistemological and ontological beliefs.

3.3. Religion and Neurotheology

As already mentioned, neurotheology is generally understood from two differing viewpoints: as a subdiscipline of the neurosciences, or, as in this case, the theological interpretation of neuroscientific data. The latter approach can then be subdivided further into another two perspectives – apologetic and integrative.

3.3.1. Apologetic view

> Explaining religious experience in terms of brain functions will not change the way people experience God...Religion may be explained along with human evolution. It may have developed with the growth of human consciousness to help humans make sense of life. Even if this is so, it doesn't falsify the existence of God or abolish religion. God might even have chosen it to happen this way (Du Toit, 2007:295)

Brandt (et al., 2010:306) describes this approach essentially as using the evidence of neuroscience to confirm or justify theological claims. In this regard he refers to James B. Ashbrook's joint publication with Carol Rausch, in which they represented the apologetic view as a 'natural theology of the brain' (cf. Blume, 2011:306). The central premise of their work is that

the brain and its features are structurally modelled after the human mind, as well as our knowledge of God (Ashbrook & Albright, 1997)[29] – in other words, the human brain is 'hardwired' to receive and process applicable information in other realms of knowledge (cf. also Muller, 2008). Based upon this assumption, proponents of the apologetic view, such as Ashbrook and Albright, claim that the human brain is able to perceive attributes of God (cf. Winkelman, 2004:203).

Natural theology has been gaining a considerable amount of ground among the apologists, not only when engaging the neurosciences, but also the whole spectrum of scientific inquiry – biology, geology, cosmology, genetics etc. Researchers such as Alister McGrath, Nancy Murphy, Arthur Peacocke, Francis Collins, John Polkinghorne and Keith Ward, to name a few, have begun to argue that creation – encompassing all of the natural world – cannot be fully understood without reference to a (the?) Creator, or Ultimate mind/reality. God works in and through the natural world, and thus it would be possible to get to know certain attributes of God's character by studying the natural world – which would include the human brain.

3.3.2. Integrative view

...experience (notably, the experience of "the unity of a being"...) is in [*sic*] the core of religious life. This experience, when interpreted by means of modern methods of neural sciences, should lead to conceptual change in theology – Andrej Jeftic (2013)

Brandt (et al., 2010:306) describes the integrative view of neuroscience from a theological perspective as an approach wherein neuroscience informs a person's theology at a *fundamental*[30] level – thus the movement is from theology to neuroscience, as opposed to the

[29] In correlation with this perspective, Ashbrook (1984) makes the following statement: "the mind is the significance of the brain and God is the significance of the mind." For Ashbrook, the mind had a bridging function between the brain and God, thus there could be no reductionistic view of the working brain.

[30] Fundamental, in this respect, is used in terms of the core or cardinal tenets upon which a certain view is perpetuated.

movement in the apologetic view: from science to theology. This opens up the possibility of a dynamic reimagining of the theological enterprise.

Certain traits of this approach can also be perceived in the work of Newberg and d'Aquili. For them, a creative tension exists between a necessary agnostic stance on the grounds of their profession as neuroscientists – to view religious and mystical phenomena objectively – and making bold theological[31] claims based on their neuroscientific studies.

An interesting attribute of this view, in some cases, is an almost utilitarian/pragmatic interaction with spirituality – RMS practices become useful devices or methods to be utilized in the service of betterment of the human condition – to provide dynamic answers for equally dynamic questions.

In his article Spirituality and the Aging Brain (Newberg, 2011), Newberg indicates that there are evidence supporting the significant effects religious and spiritual practices, such as meditation and prayer, might have on the brain. Positive effects include improved memory and cognition, mood and overall mental health. In the same vein, Newberg proposes the utilisation of spiritual practices for neurodegenerative diseases: "Meditation techniques present an interesting potential adjuvant treatment for patients with neurodegenerative diseases and have the advantage of being inexpensive, and easy to teach and perform" (Newberg et al., 2014:112).

3.3.3. Conclusion

At this point it is again important to distinguish clearly between the apologetic and the integrative views.

The most prominent differences are that of their respective epistemologies – how they relate to reality. For the proponents of the apologetic approach orthodox theology stands *a priori* – from the vantage point of theological reflection personal experience is interpreted and the scientific

[31] A distinction should be made that their claims have theological undertones, and not necessarily supernatural ones.

study of nature is used to validate theological claims.

One example of this would be that of nuns in communal prayer. They experience something akin to the transcendent presence of God and validates this experience by referring to the Scripture of Matthew 18:20 for example, "For where two or three are gathered together in My name, I am there in the midst of them." The fact that neurological studies have shown certain neural behaviour accompanying the specific experience the nuns had, does not discredit it for them, but rather affirms their belief in an omnipresent Creator. [32]

On the other hand, for the proponents of the integrative approach, it would seem that RMS experience stands *a priori* (cf. Brandt et al., 2010:306). Theological notions do not determine, but are rather derived from prior RMS experiences, and then informed by means of neuroscience (both in a physiological and psychological sense). In this instance it is expected that new neurological insights must bring drastic changes in theology – in other words, neuroscience informs and, by implication, reforms theology. The implications of such a view may entail that a person's theology must be fluid, in the sense that it is not rigidly bound to doctrine.

3.4. Critically engaging and categorising Newberg's neurotheology

At this point in the study a clear outline has been given of Newberg's neurotheological model. An adequate framework of different utilizations of neurotheology has also been given, within which most neurotheological approaches could be placed with relative ease. From this framework it would be possible to extrapolate Newberg's model's paradigmatic underpinnings even further.

[32] The researcher is aware that this matter can be complicated by asking the question of objectivity with regards to the theology in question – e.g. can there be a 'view from nowhere', even when praying nuns look to their Scriptures for guidance, or is the best that can be hoped for some sort of intersubjectivity? However, it is not within the scope of this chapter to discus the objective-subjective topic, and the researcher would settle, for the sake of the intended outcome, to have four clearly separated categories to aid the following engagement with Newberg's model.

It consequently serves the purpose of distinguish his model more clearly as it pertains to neuroscience and theology proper.

The remainder of this chapter will be dedicated to critically engaging Newberg's neurotheology with the intention of sufficiently categorising it within the framework given above. This will be done in order to be able to properly compare his integrated model with a cognitive neuroscientific and a reformed theological one in chapter 5. This researcher understands the problematic nature of trying to categorise any one model – given the fact that even within a pure and seemingly isolated research field, such as the theological or scientific enterprise – there are numerous distinctive schools with very specific, and sometimes unique, nuances with regards to their field of study. It should be no different when examining Newberg's model in relation to the broader field of neurotheology.

Blume (2011:307) confirms this by stating that "many 'neurotheological' hypotheses are marketed by claiming to constitute 'the' contemporary understanding of brain science(s)." But, he argues, there are no such thing as a single perspective on the human brain – the organ and it's functions are constantly being studied by a number of unique and, quite often, competing entities. Blume (2011:307) argues that religion-related claims are "drawn from classic neuroanatomy refreshed by brain imaging studies."

It is at this juncture that Norman and Jeeves (2009) cautions the neurotheological endeavour to actively avoid sliding into a 'reinvented phrenology'. [33] The big problem Norman and Jeeves (2009:243) identify with classical phrenology is that although it was empirical, it was not scientific. They give the example of Franz Gall arguing that the localization of certain behavioural and psychological phenomena based on measurements of the subject's head, or skull, if it was done post-mortem, may be based on measurement data, but it is not a scientifically credible

[33] Phrenology can basically be described as the prominent nineteenth-century doctrine that a number of mental faculties constituted the functioning of the human mind – in short, phrenology was pre-occupied with the localization of mental function in the brain (Norman & Jeeves, 2009:235).

exercise to make such bold assertions from the gathered data. They consequently propose that modern-day neurotheology might also run the risk of not being scientific, stating that, although they do not deny the mass of collected empirical data that relates to measurements in brain activity regarding RMS experiences, they question "whether investigations of the relationship between brain activity and religious/spiritual activity have been scientific" (2009:243). The suspicion that Norman and Jeeves voices in this regard (2009:244), is the concern that empirical data is being collected only to support certain hypotheses and not to disprove them – in their own words, if "investigations are designed only to collect confirming evidence or if results are explained in a post hoc manner."

Notwithstanding their 'empirical-but-not-scientific' critique and caution for neurotheology, Norman and Jeeves (2009:244) do state that they would find it hard to argue for a position where an RMS experience, either behavioural, affective or perceptual, could occur without any accompanying brain activity. They therefore endorse this area of study, but propose a careful consideration of the definitions and modes of measurement used with regards to brain activity and its connection to RMS experiences.

There has been a great amount of debate about the nature of brain activity that would accompany RMS experiences. Jeftic (2013:271) states that neurological activity during these experiences can be regarded as a truism, but that the same cannot be said with certainty about the form of the neurological activity. He references Matthew Ratcliffe who maintains that, "the fact that a person undergoing an experience recognizes it as religious...does not mean that it represents a particular form of a neurological experience" (in Jeftic, 2013:271) – the example has been given of the difficulties in being able to differentiate between experiencing a cat and experiencing RMS phenomena.

Thus Ratcliffe (2006) is of the opinion that, in order for neurotheology to establish itself as an autonomous discipline, it must be able to clearly define a unique neurological category of RMS experience. [34] He, however, strongly believes that the possibility of such a categorization is

[34] At this point Cunningham (2011:225) brigs the discussion back to the issue of localizing certain brain

impossible, due to the fact that every so-called *unique* type of experience is only recognized as such during the course of interpretation – a further complication is the context-laden nature of- and language used to interpret the experiences.

In light of the above, one question remains for Norman and Jeeves: "It can be argued that scientific investigations conducted in the context of neurotheology will, by definition, deal with the natural order of things. The question is, to what extent can a naturalistic understanding further our understanding of spiritual activity that is conceived as transcendent?" (2009:245).[35]

Now on to Newberg's specific handling of the subject matter. "Newberg's vision for neurotheology is extraordinarily ambitious. Though his initial definition of neurotheology is deceptively simple—"the field of study linking the neurosciences with religion and theology" (Barrett, 2011:133). For Barrett, Newberg's vision to establish a meta- and megatheology, grounded in the two universal elements of religion and the human brain, initially seems like a genuine pursuit of an integrated perspective on religion and science. However, he states that in the end, especially looking at Newberg's Principles of Neurotheology, it is clear that the real drive behind his neurotheology is brain science. He extrapolates from Newberg's writings, that his hope lies in the assertion that neuroscience, in tandem with a "rich phenomenology of religious experience", [36] will enable neurotheologians to answer perpetual questions about the nature of consciousness and reality, as well as the existence of God (Barrett, 2011:133).

Although, Barrett states, Newberg is always meticulous in leaving room for the possibility that

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functions, coupled with unique experiences, in that the experience for which a locus is sought, would need to be defined very clearly. He states that "religious experiences, like all other psychological experiences which do not take up space and cannot be physically observed, require something else which can be observed to represent or "stand in for" them (i.e., an operational definition)."

[35] This allusion to natural theology will be explicated in chapter five.

[36] Persinger and Lavallee (2010:600) stresses the necessity of using appropriate neurophysiological methods to capture subjective phenomenological experiences.

the religions of the world have already obtained experiential access to ultimate reality. He states that it is still Newberg's belief that neuroscience will play a decisive role in improving the human condition and guiding the human race toward a 'new enlightenment' as well. It is a further contention of Newberg that this can be accomplished by using neuroscience to develop a systematic understanding of religious experience (Barrett, 2011:133).

Barrett (2011:134) goes further by critically engaging Newberg's principles for neuroscience, as well as the epistemological implications they carry. He finds Newberg's principles to be clear and straightforward, but not justified adequately. Barrett particularly brings Newberg's epistemological premises that seem to epitomise neuroscience for a religio-scientific synthesis into question. The basis on which he does this is, again, that it is not sufficiently examined or justified. This is problematic in that Newberg's *neurotheological hermeneutic*, derived from his intended epistemology, can, in Barrett's view (2011:134), be seen as 'the most distinctive feature of his [Newberg's] methodological approach'. Indeed Barrett (2011:134) goes even further in arguing that Newberg's view of how the brain determines a person's experience of reality, is not just the cornerstone on which he builds his religio-scientific synthesis, but it can be surmised to be the fundamental premise of his neurotheological model.

Barrett bases his argument on the tenth chapter of Newberg's Principles (2010:249-265) – 'Epistemological Issues in Neurotheology'. The central thrust of this chapter is the proposition that neuroscience, in tandem with the phenomenology of, what Newberg calls, 'primary epistemic states', might be able to offer leverage surrounding questions about the ultimate nature of reality. Barrett's critique lies with the irony of such a proposition, that "leverage is gained by placing us in an epistemological predicament of seemingly hopeless isolation" (2011:134). This comment is made with reference to Newberg's contention that "we are trapped with our brain peering out into the world and reconstructing it the best we can" (p. 252).

It would would benefit the discussion to linger on Newberg's account of baseline reality for a moment. Gilroy (2005:11) calls into question Newberg's "unusual blend of dual aspect[37] and

[37] According to Gilroy, Baruch Spinoza put forth the idea of dual-aspect theory, as a way to avoid an

epiphenomenalist[38] positions on the mind/body problem." Furthermore he argues that, "while abiding by this view, Newberg is not obligated to explain the interaction between a Cartesian body and mind. His neurotheological model, however, does sustain a definite distinction between brain and mind, and freely builds upon the presumption that brain somehow creates mind" (2005:11). Gilroy's suspicion remains on the grounds of Newberg's acknowledgement of the fact that the "precise nature of the mind-brain relationship remains mysterious..."[39]

Barrett concludes his review of Newberg's Principles by stating that his neurological presuppositions are not overly novel among the cognitive sciences. He argues that Newberg falls comfortably within the standard epistemological stance that can be viewed as a "kind of 'evolutionary Kantianism,' i.e. a formalist[40] and representationalist[41] view bolstered by evolutionary biology and given specious clarity by the computational metaphor of the brain as

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explanation of how the interaction between such dissimilar entities as Cartesian minds and bodies would occur. His answer to this problem was to opt for an all-encompassing substance within which mental and physical entities could reside, as non-interacting attributes of that substance, distinct from each other, though still correlated.

[38] Epiphenominon: a secondary phenomenon accompanying another and caused by it; specifically **:** a secondary mental phenomenon that is caused by and accompanies a physical phenomenon but has no causal influence itself (Merriam Webster, 2015: Epiphenominon)

[39] Gilroy (2005:12) cites Newberg in this regard as saying: "The inexplicable unity of the biological brain and its ethereal phenomenon of mind is the first aspect of what we have defined as the mind's mystical potential."

[40] Formalism: the practice or the doctrine of strict adherence to prescribed or external forms (as in religion or art) (Merriam Webster, 2015: Formalism)

[41] Representationalism: The doctrine that the immediate object of knowledge is an idea in the mind distinct from the external object which is the occasion of perception (Merriam Webster, 2015: Representationalism).

an information processor" (2011:135). To put it into less laden terms, Newberg argues his case for a *neurotheological hermeneutic* from the contention that the human mind-brain has evolved to process and interpret information,[42] being subject to socio-culturally conceived ideas as a coping mechanism to understand and categorise perceived reality.

My last comment relates to Newberg's methodological approach. Ladd and Ladd (2010:220) states that, regarding d'Aquili and Newberg's ground-breaking work, The Mystical Mind, that "readers could put down this book mistakenly believing that neuroscience results are clean and crisp, with interpretations that border on the self-evident. This is not the case in the mainstream of neuroscience, however, let alone in the subfield exploring issues of spirituality." They cite what Nichols and Poline[43] noted about the kind of studies that employ fMRI technology. According to them these studies are, at best, 'problematic in that the common multiple-testing approach can unintentionally alter interpretations of significance and that methods are vastly under-reported.' (in Ladd & Ladd. op. cit.). From this it would seem that there are a few problems that need addressing – the most important of which is that precise operationalization in the realm of RMS experience are indeterminately more elusive than what has been shown to be true, even when dealing with observable brain structure and functional response.

3.5. Conclusion

The obvious shortcoming in all attempts to categorise a spectrum of different views about a certain subject – in this case, Neurotheology – is the fact that the subtle nuances and micro-spectrums within each category are overlooked for the sake of categorical distinction. To give an example, some proponents of the reductionist stance might be more inclined toward accepting and incorporating certain elements of the religionist view, while others might hold to the core

[42] Van Huyssteen, in his book *Duet or Duel?* (1998a), argues that an evolutionary epistemology, from which rationality arises, is the key to understanding the universe.

[43] For further reading regarding critical reflection on fMRI usage in neurological studies refer to, Nichols, T.E., & Poline, J. 2009.

tenets of reductionism with militaristic vigour. However, keeping in mind one of the purposes of this study – discovering to what extent Christian reformed theology might interact with Newberg's model – it would prove beneficial to be able to place his neurotheological viewpoint within this framework. In order then to sufficiently accomplish this, it is necessary to review the discussion.

It would seem that Newberg's neurotheology and consequent handling of the neurosciences, could be regarded as one amongst a lot of other schools – thus it does not represent the only contemporary understanding of the neurosciences, even though he has a quite standard epistemology pertaining to his research field. Methodological issues have been noted as well.

With regards to the inclination of using neurological findings to hypothesise theological assertions – positive or negative – Newberg's neurotheology might run the risk of facing the same critique as that of classic phrenology. The main thrust of this critique resting upon the claim that such studies may be empirical in the way it collects data, but that the conclusions are sometimes far from being scientific. The primary concern in this regard would be the admonition that, although it can be said with certainty that brain activity accompanies RMS experiences, it is not conclusively possible to isolate any one standard model of brain activity during these experiences, due to an immense amount of variables that need to be taken into account – e.g. the subject's socio-historical and cultural background, personal inclination toward RMS experiences, the influence of an unnatural/clinical setting within which these experiments and studies take place and "especially experiences that in more natural contexts are reported to be transient, noetic, and ineffable (i.e., inaccessible for introspection and unavailable for verbal reports)" (Cunningham, 2011:226).

Furthermore, the 'neurotheological hermeneutic' is a problem for theology but not necessarily for neuroscience. This point has been raised, not only because of the epistemological isolation inherent in Newberg's view of the relation between reality and the cognition thereof, but also because the object of subjective 'transcendent experience' is largely being discounted in neurotheological hypotheses. In other words, the experience itself is isolated and described in naturalistic terms without regard for the transcendent object thereof when making predictions.

Thus, in Newberg's work a disregard for theology is immanent in what seems only to be a concern for what can be gained by studying RMS experiences – e.g. grounds for a meta- and megatheology that would incorporate all RMS experiences and theologies.

Taking into consideration all that has been said, discussed and elucidated, in the current and previous chapter, it still remains a difficult task to place Newberg's neurotheological approach within the framework given at the start of this chapter. It would seem that Newberg alternates between a religionist approach and a seemingly integrated approach. While professing no formal allegiance to either theology or neuroscience, for his progression toward a meta- and megatheology to be credible, most reviewers of his work would feel comfortable in placing him away from being a fully fledged integrationist[44] – his dependence on the neurosciences in experimentation and hypothesising is a primary consideration. On these grounds it would seem reasonable to this researcher, to categorize Newberg as a religionist, with a few subtle nuances indicating an attempt at integration – in line what Brandt observed (2013:306).

When looking toward the next chapter, it is necessary to note what has already been done. A thorough outline of the foundation of Newberg's neurotheological model has been given, it has been critically engaged both in isolation, as well as within the scope of the broader neurotheological endeavour, delineating some of the issues with the epistemology and methodology within this field. In the conclusion of this chapter, Newberg's model has been tentatively placed within a certain research neurotheological disposition. Taking into account Newberg's vision of a possible meta- and megatheology being constructed by his neurotheological model – and the consequent paradigm shift it may illicit from the fields of neuroscience or theology or even both – it is now necessary to establish if any of these two fields would be sufficiently implicated by any neurotheological progress, to warrant such a paradigm shift.

[44] This is evident from the critical discussion above, as well as will be from the content of chapters four and five.

To this end, it will be the purpose of the following chapter to thoroughly establish the paradigm of enquiry within which Newberg's model functions. Once this has been achieved, in relation to chapter five's content, it would be possible to properly describe the parameters of the relationship his neurotheology can have with both neuroscience and theology.

Chapter 4 – Paradigm-theory

4.1. Introduction

It is critical to be open to the possibility of developing new methods and new paradigms for understanding neuroscience and theology – Newberg (2010:117)

This chapter will give a brief account of what is meant by 'paradigm-theory' as it pertains to the ontological, epistemological and methodological assumptions of research models, theories and research fields – with specific reference to Thomas Kuhn's ground-breaking work *The Structure of Scientific Revolutions* (1962). A basic outline and brief discussion of the four received and alternative inquiry paradigms will also be presented, namely: positivism, postpositivism, critical theory and constructivism. A description and discussion of qualitative, quantitative and mixed method research will follow, also showing how it relates to the four basic paradigms. The final part of this chapter will offer an overview of the ontological, epistemological and methodological assumptions of Newberg's neurotheological model – also drawing on the critical discussion in the previous chapter. Lastly, there will be an evaluation of how this model fits into the qualitative-mixed method-quantitative continuum. The rationale and significance of this chapter can be described as follows:

As was shown, Newberg's project is permeated by two primary aspirations:

1. Becoming a meta- and megatheology – describing all RMS phenomena[45] in terms of its basic neurological underpinnings and, by extent, informing the world's religions of their inherent neurological tenets.

2. Eliciting a paradigm shift from either the scientific or theological endeavour,[46] or both;

[45] This includes mythmaking, ritual, liturgy, mysticism, near-death experiences and the experience of absolute unitary being, to name a few (d'Aquili & Newberg 1999).

[46] As Newberg (2010:58f) describes it: a paradigm shift in the sciences might occur due to a better

either in terms of its correctness, or usefulness in studying and describing reality.

These two aspirations have the potential to herald important implications for both science and theology, should it indeed prove probable that Newberg's neurotheology is a proper religio-scientific synthesis. It is the intention of this researcher elucidated this probability on the grounds of Newberg's model's paradigmatic function – how Newberg does neurotheology – and the extent to which it integrates qualitative (traditionally associated with theological research) and quantitative (traditionally associated with empirical scientific research) methodologies.

4.2. Data, Theory, Models and Paradigms

Paradigms are created by collecting data and constructing theory from it. According to Barbour (1997:106f), science has these two basic components (data and theory). He suggest to correlate this fact with religion on the basis that 'data' could be viewed as religious experience, ritual and story and that the beliefs held by religions do have a similar function as that of 'theory'.

With this in mind Barbour (1997:107f) elucidates how theories are related to data. He briefly elaborates on the classic – bottom-up – inductive method of inquiry.[47] This he dismisses on account of not being sufficiently able to test any theory derived from induction by means of

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understanding of the data relating to 'distant intentionality'/the effects that consciousness has on the world. Conversely, a religious paradigm shift might occur in two ways, namely that one religion is proven to be the correct one, or that all religions are conclusively proven to be wrong.

[47] Inductive research moves from observation of data, to forming models and analogies depicting certain patterns that have been observed and then postulates theories based on these analogies. It claims to explain phenomena 'as is' and as such leave no room for falsification – an example would be: "all animals that I have observed must eat to survive, thus all animals on earth must eat to survive."In effect this method of research quickly leads to the formulation of very abstract and generalized theory (Barbour, 1997:107) that tend to validate and explain analogy, but not reality (cf. Heit & Rotello, [2010] and Ketokivi & Mantere [2010] for further perspectives on the relation of inductive reasoning to deductive reasoning, as well as the challenges involved in inductive reasonging).

experimentation. He states that theory should lead us to expect some observations, but not others – no single theory is capable of encompassing all possible variables and account for all possible outcomes. With this in mind he describes the – top-down – hypothetico-deductive method. This method moves from theory to observation. "If a theory or hypothesis is valid, then particular observational patterns are expected, though the reasoning process always involves a variety of background assumptions, auxiliary hypothesis and rules of correspondence linking theoretical and observational terms" (Barbour, 1997:107).

The initial assumptions of this practice was the fact that data could be described in an objective, theory free language of observation and that this fixed, objective data could be used to test alternative theories. However, Barbour (1997:108) clearly states that "all data are theory-laden." The influence of theory on research can be observed even in the decision of which phenomena to study, as well the choice of variables to be considered significant enough to measure – "the form of the questions we ask determines the kind of answers we receive" Barbour (1997:108). Of particular importance when evaluating Newberg's model according to these standards later on, is the fact that the object being observed (in the case of neurotheology: it is RMS phenomena) may even be altered by the process of observation itself. As was alluded to in the previous chapter (please see 3.5), true RMS experiences, especially those of absolute unitary being, are not, in general, mechanistically produced on demand.

Although the scope of this study does not involve a clinical evaluation of the theoretical competence of Newberg's model, it is useful to note Barbour's (1997:109ff) four criteria for assessing the validity of theories created in normal scientific research, as well as truth claims associated with them in light of the purpose of this chapter:

1. Agreement with Data – although being the most prominent criteria, it does not prove a theory to be true. It is possible that future theories may also fit the data well or even better. Theories, as noted above, hold to the promise of success and can merely be underdetermined by data. It can even tolerate anomalies for an indefinite period. The prediction of novel phenomena in accordance with the data and what Barbour calls "predictive success" (1997:112), does establish notable support for a theory.

This view advocates truth on the basis that a proposition needs to correspond to reality. Barbour explains that such an approach is typical of classical realism, due to its dependence on empirical evidence. The problem, however, is as have been noted above: data cannot be obtained without the influence of antecedent theory.

2. Coherence – a measure of consistency with accepted theories, as well as a conceptual interconnectedness with them is important. Scientists place a lot of value on theories that are simple and as well as internally coherent.

   This view advocates truth on the basis that a proposition needs to be comprehensive and internally coherent. Proponents of this view can be described as rationalists, or philosophical idealists, as it seems that this view fits the theoretical side of science. The problem with this view is, Barbour states, that no theory can be considered in isolation – it needs to be evaluated with reference to a network of theories. Thus, coherence should always be considered alongside scope. Barbour's concern with this view is that, in any given domain, there may be a number of internally coherent set of theories. He adds to this that reality more often would seem less logical and more paradoxical than the rationalists presume (Barbour, 1997:113).

3. Scope – theories are judged in terms of comprehensiveness or generality. Value is placed upon theories that can bring unity to previously disparate fields, that are supported by an array of evidence types, or if it is applicable to a wide range of the variables in question (Barbour, 1997:113).

4. Fertility – a theory is not respected for its laurels (or past achievements), rather it is respected for its ability and promise to provide guidance for an ongoing research program. Barbour (1997:113) asks the question: "is the theory fruitful in encouraging further theoretical elaboration, in generating new hypotheses, and in suggesting new experiments?" Value is placed upon a scientific community with continuous research activity.

   This view advocates that a proposition needs to work in practice (the pragmatic view).

> Proponents of this view, such as instrumentalists[48] and linguistic analysts, are not too bothered by questions of truth. For them, the focus of a proper theory should be to solve problems. Barbour critiques this view on the basis that, whether an idea is *useful* or *works* remains unclear, until other criteria can help to further specify its concepts.

In light of the above, Barbour (1997:110f) professes that his personal conclusion about the meaning of truth is, in short, "correspondence with reality." He clarifies that, because reality will always be inaccessible to some extent, al four of the tenets mentioned above must be included to provide a sufficient criteria for truth. In terms of operationalizing a model from these specifications, Barbour explains it as a form of realism – because the definition of truth is taken to be "correspondence" (1997:111) – but that it should also be deemed critical, because of the combined criteria in use. Thus, it can be surmised that Barbour opts for a critical realism view of reality, when in pursuit of truth.

In most instances, theory has the need of a concrete model to optimize operational value – "a model is a structure that makes all sentences of a theory true" (Frigg et al. 2012). Barbour elaborates on this in stating that "…models usually take the form of imagined mechanisms or processes postulated in a new domain by analogy with familiar mechanisms or processes" (1997:115). According to Frigg et al., models have the capacity to facilitate two fundamentally different representational functions: "On the one hand, a model can be a representation of a selected part of the world (the 'target system'). Depending on the nature of the target, such models are either models of phenomena or models of data. On the other hand, a model can represent a theory in the sense that it interprets the laws and axioms of that theory. These two notions are not mutually exclusive as scientific models can be representations in both senses at

[48] John Dewey and Karl Popper were the two most notable instrumentalists of the twentieth century. They both agreed on a functional definition of instrumentalism as Dewey put it: "instrumentalism is an attempt to establish a precise logical theory of concepts, of judgments and inferences in their various forms, by considering primarily how thought functions in the experimental determinations of future consequences" (cf. Boydston, 1984).

the same time" (2012).

In this light, Barbour posits three characteristics of models:

1. Models are analogical – a researcher breaking new ground may postulate entities that have both familiar and unfamiliar connotations to existing entities. Barbour gives the example of Niels Bohr's planetary model of the atom and its electrons, in which the familiar model of the solar system comes into play – planets orbiting the sun (1997:115). Although, unlike the solar system, the electrons' orbits differ considerably from the original model – therein lies the unfamiliar.

2. Models contribute to the extension of theories – it is often claimed that a model is a 'temporarily useful psychological aid' that holds only until a theory's equations are formulated. Barbour is of the conviction that it is quite often the model, not the theory, that suggests its applicability to new phenomena or data. He gives the example of how the billiard ball model contributed to both applying the kinetic theory of gases to other domains, as well as reconstructing the theory itself (1997:115).

3. Models are intelligible units – "models provide a mental picture whose unity can be more readily understood that that of a set of abstract equations" (1997:116). What strikes Barbour about models, is that it can be understood as a whole, summarizing vividly the complex relationships inherently present.

Significant amounts of research are conducted on models, rather than reality itself, because, as Swoyer (1991:450) puts it, models allow for "surrogative reasoning." By studying a model it is possible to discover and ascertain features and facts about the system the model incorporates. It is in this respect that there has been given a lot of attention toward the cognitive function of models. It has even been suggested that models gave rise to a new kind of reasoning called 'model based reasoning' (see Magnani et. al., 1999 and Magnani and Nersessian 2002 for further reading on this subject).

Models and theories operate within paradigms. Egon Guba (1990:17) defines a paradigm in the

following manner: “a basic set of beliefs that guide action, whether of the everyday garden variety or action taken in connection with a disciplined inquiry.”[49] These directing entities are called belief on the grounds that there is no way to establish their ultimate truthfulness, how ever well it might be argued. In this light, Kuhn posits that without a set of received beliefs, a scientific community cannot practice its trade. Beholden to these beliefs, coupled with the assumption that, through science, it truly is possible to know that the world is like, normal science will suppress any novelties which might undermine its foundations. Kuhn therefore declares that the primary objective of research is not necessarily to discover the unknown, but rather "a strenuous and devoted attempt to force nature into the conceptual boxes supplied by professional education" (1962:6).

Thus, *scientific revolutions*, as Kuhn describes them, are the result of an anomaly that undermines the basic assumptions of a certain scientific practice, to the extent that it necessitates a shift in the professional commitments to these assumptions. In the aftermath of scientific revolutions, new assumptions – or ‘paradigms’ – require the re-evaluation of prior facts and the reconstruction of prior assumptions. This process is usually very time consuming as well as strongly resisted by the established community – as will be the case when such a shift could be prompted by neurotheology. The fact of the matter is, as Barbour (1997:108) explains it, paradigms are much harder to overthrow than theory or a specific model within a given paradigm. It is therefore imperative that clarity should be sought regarding neurotheology’s status in this respect – is it merely a model operating within a designated paradigm, or could it be considered as a paradigm in itself?

To explain how paradigms are created in the first place and what they contribute to scientific

[49] In Guba & Lincoln (1994) he elaborates further on this definition “A paradigm may be viewed as a set of basic

beliefs (or metaphysics) that deals with ultimates or first principles. It represents a worldview that defines, for its holder, the nature of the "world," the individual's place in it, and the range of possible relationships to that world and its parts, as, for example, cosmologies and theologies do.”

inquiry, Kuhn (1962:10ff) explicates what he calls 'the route to normal science'. Normal science "means research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice."[50] Paradigms, in this instance, are likened to these achievements, with a few recommendations: they must be sufficiently unprecedented in order to attract a group of adherents away from contending modes of scientific activity. It must also be sufficiently open-ended as to leave the new group with a fair amount of novel problems to resolve. Thus, a paradigm is a shared commitment to abide by a certain set of rules and standards for scientific practice, in order to create avenues of inquiry, formulate questions, select methods with which to examine questions, define areas of relevance and establish or create meaning'. Kuhn makes the claim that "no natural history can be interpreted in the absence of at least some implicit body of intertwined theoretical and methodological belief that permits selection, evaluation, and criticism" (Kuhn, 1962:38). If a paradigm offers the promise of success, normal science endeavours to actualize that promise.

4.2.1. The Basic Paradigms of Inquiry

Now that a clear view about the process of inquiry and the apex thereof in paradigm establishment has been given, a description of the four basic paradigms of inquiry will be given.

Paradigms of inquiry define parameters for the inquirer of what can be seen to fall within the realm of legitimate inquiry and what falls outside of it. The basic beliefs of any paradigm can be ascertained in accordance with what proponents of any one paradigm would answer to the following three questions: [51]

[50] Beholden to this definition, it would be safe to endorse Neurotheology as part of the 'normal sciences', due to it reliance on contemporary neurological assumptions.

[51] Guba and Lincoln (1994:108) argues that the order in which these three questions will be elaborated upon reflects the most logical primacy.

1. The Ontological question: "What is the form and nature of reality and, therefore, what is there that can be known about it?" (Guba & Lincoln, 1994:108). Guba & Lincoln gives the example that, if a 'real' world is assumed, then all that can be known about it is the 'way things really are' and the 'way things really work'. Therefore, only questions relating to this real existence and real action are acceptable. Questions involving morality or aesthetics would naturally fall outside the scope of legitimate inquiry according to this paradigm.

2. The Epistemological question: "What is the nature of the relationship between the knower or would-be knower and what can be known?" (Guba & Lincoln, 1994:108). The answer to this question is necessarily constrained to the answer given to the ontological question. Staying true to the assumption of a 'real' reality, the attitude of the inquirer must be one that Guba & Lincoln calls, 'objective detachment' or 'value freedom'. This disposition is necessary to discover how things really are and how they really work.[52]

3. The Methodological question: "How can the inquirer (would-be knower) go about finding out whatever he or she believes can be known?" (Guba & Lincoln, 1994:108). Regarding the first two answers, not just any methodology can be deemed appropriate. For example, an objective inquirer pursuing a real reality would be constrained by a mandate to control possible perplexing factors – this will be the case whether either qualitative, quantitative or mixed methods are used.[53] [54] Lastly, methodology are not just a collective term for the methods being used, but it determines the methods to be used.

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[52] If the epistemological question had primacy – a knower must be objectively detached – then the assumption would follow that there exits a 'real' reality to be objective about.

[53] These three methodologies will be expounded upon later-on in 4.3.

[54] If the methodological question had primacy and a manipulative method was chosen – e.g. experimentation, for argument's sake – it follows that the inquirer should be objective and that there should be a 'real' world to be objective about.

Guba and Lincoln (1994:108) argue that paradigms are ultimately the "the most informed and sophisticated view that its proponents have been able to devise, given the way they have chosen to respond to the three defining questions." Thus, as human constructions, paradigms are not invulnerable to human error. As a consequence there are no incontestable arguments or assumptions in paradigms – rather, proponents of a certain view must rely on the persuasiveness and utility thereof, in arguing their position.

With all of this in mind, here are the four basic paradigms (Guba & Lincoln, 1990:19-27):

Positivism

- Ontology: Realist – reality really exist 'out there' and is driven by incontrovertible natural laws and mechanisms. Knowledge of these entities within reality are traditionally summarized in 'time- and context-free' generalizations. In some instances these generalizations could take on the form of cause-and-effect laws.

- Epistemology: Dualist/objectivist – the inquirer adopts a nonintrusive and objective stance toward reality. This way the influence of values and biases are factored out of the intended outcomes.

- Methodology: experimental/manipulative: propositions are made in advance in the form of questions and hypotheses. These proposals are then subjected to empirical tests in controlled conditions, with the intention of testing for falsification.

When committed to a realist ontology, an objective epistemology is the only option for the positivist. When an inquirer believes that there is a real world out there, he/she must be able to ask it direct questions from which he/she can expect direct answers . The inquirer takes up position outside of reality, looking in. in this instance the question can be raised: how can there be accounted for the possibility of *inquirer bias*, on the one hand, and nature's ability to confound, on the other? For the positivist the answer lies in manipulative methodology and empirical methods to take the inquirer out of the equation, leaving nature unintruded and vulnerable.

Postpositivism

- Ontology: critical realist – reality, although it exists really, can only ever be partially understood and never fully apprehended – thus the need for analogous models.

- Epistemology: modified objectivist – objectivity remains the ideal means of acquiring knowledge, but it is no longer in an absolute state. Rather, it can be approximated by means of external 'guardians', such as the critical community and the critical tradition.

- Methodology: modified experimental/manipulative – emphasis is placed upon critical multiplism. The imbalances of pure experimental/manipulative methodology is addressed by doing inquiry in more natural settings, reintroducing discovery, using more qualitative methods, while depending more on grounded theory.

This paradigm seeks to undo the damage that has been done by the naïve realist posture[55], by redirecting it to a more critical stance. The rationale behind this shift is based on the imperfect sensory and intellectual mechanisms that humans use in the perception of reality – this notion is then factored into the research, which bids a critical stance toward what is uncovered. Epistemologically speaking, the assumption of being able to stand outside of reality and even outside of humanness for the duration of inquiry has been found to be absurd. It has been demonstrated that any and all 'findings' that may emerge from inquiry, come from the interaction between the inquirer and what is being inquired into. Thus, objectivity is a regulatory ideal which directs the inquirer to be as neutral as possible, but also to identify the predispositions the inquirer brings to the inquiry. Part of the methodological implications for this regulatory principle is an interaction with the critical community and critical tradition – to draw on as many sources as possible when inquiring into reality.

[55] For a comprehensive history of the reasons for this paradigm-shift, please see Godfrey-Smith 2003: Problems and Changes

Critical Theory

- Ontology: historical realist – a reality that was once 'plastic' is deemed apprehensible, as it was shaped over time by an amalgam of social, political, cultural, economic, ethnic, and gender factors. From these influence it crystallized into structures that are assumed to be natural and immutable – a virtual or historical reality (cf. Guba & Lincoln, 1994:110).

- Epistemology: Transactional and subjectivist – the investigator and investigated object are interactively linked by the values of the investigator, which inevitably influences the investigation. This purports to value mediated findings. This challenges the distinction between ontology and epistemology, in that knowledge of reality is only gained by interacting with reality.

- Methodology: dialogic and dialectical– due to the transactional nature of the inquiry, a dialogue between the inquirer and the subjects of the inquiry is necessary. This should be done in a dialectical fashion in order to transform ignorance and misapprehensions. (cf. Guba & Lincoln, 1994:110)

Guba deems the label 'critical theory' to be limited in the scope it is supposed to implicate. Rather, he states, it should be termed "ideologically oriented inquiry" (1990:23). This view stands opposed to the supposed value-freedom propagated by postpositivists. A paradigm, as a human construct, indubitably reflects the values of its constructors. All areas of inquiry, such as the selected problem, most relevant paradigm, instruments, analytic approaches, interpretations etc. are selected based on the specific values and assumptions of the inquirer. Value is the hermeneutic window through which reality is perceived. The problem in this regard is that certain inquirer's values could become dominant, over and against those who have less influence in the same field – thus it becomes a political act whereby some are empowered and others are disempowered. The methodology of critical theory, therefore, is aimed at working towards transforming the world by raising consciousness among- and energising participants. A dialogical approach is then taken to rally participants to a common view.

Constructivism

- Ontology: relativist – reality, its form and content, is based on multiple mental constructions, contextually based on the social, experiential, local and specific exposure of the inquirer. It should in actuality be distinguished from idealism and nominalism (cf. Guba, 1990:25).

- Epistemology: subjectivist and transactional – the inquirer and what is being inquired into are viewed as a single entity, producing findings deemed as the product of interaction between the two (cf. Guba, 1990:25).

- Methodology: hermeneutic, dialectical – with the aim of rendering a few constructions that enjoys substantial consensus, constructions are produced and refined using hermeneutics, and compared and contrasted in a dialectical fashion. The reason for this is because reality can only be constructed by the individual interacting with it, therefore interaction between respondents is vital (cf. Guba & Lincoln, 1994:111).

Based on what has been described already, it seems plausible that postpositivists and critical theorists could see their way open in accommodating each other's paradigms. Conversely, constructivists feel that these paradigms are completely flawed and need to be replaced. Guba (1990:25) gives four reasons in this respect: 1) all facts are theory laden, 2) all theory is underdetermined, 3) all facts are value laden and 4) there is no escape from the dyadic nature of an inquirer/inquired-into relationship.[56]

4.3. A Description of Qualitative and Quantitative Methods

Historically, a great amount of emphasis has been placed on quantification in science. The 'queen

[56] An interesting phenomenon occurs as a result of this last statement, in that the ontological (what can be known) and epistemological (the relationship of the knower to what can be known) distinction becomes obsolete. What is 'out there' is created in a process of interaction between the inquirer and the inquired into.

of the sciences' has been deemed to be mathematics, and along with other fields that lend themselves equally well to quantification, such as chemistry and physics, are generally known as 'hard/concrete' science. Less quantifiable fields, such as can be encapsulated by, among others, the social sciences, are deemed 'soft' sciences, and described as being more qualitative (Guba & Lincoln, 1994:105-106).

When taking the paradigms discussion into account, in association with what has been said and will follow under 4.3, it will help the discussion along to categorise the four basic paradigms here. The positivist and postpositivist worldviews can be placed under the overarching quantitative paradigm, and the critical theory and constructivist worldviews under the overarching qualitative paradigm. [57] The rest of 4.3 will be dedicated to elaborating on what is meant by these two overarching paradigms.

Although it might seem that there is duplication regarding what has been explicated under 4.2.1, the researcher deems it necessary in order to establish a proper basis of reference for the description and discussion of mixed method research under 4.4. This, in turn, will supply the pivotal elements necessary to evaluate Newberg's neurotheology in 4.5.

Joanne Sale (Sale et al., 2002:44-45) summarizes the *quantitative paradigm* as follows:

> Science is characterized by empirical research; all phenomena can be reduced to empirical indicators which represent the truth. The ontological position of the quantitative paradigm is that there is only one truth, an objective reality that exists independent of human perception. Epistemologically, the investigator and investigated are independent entities. Therefore, the investigator is capable of studying a phenomenon without influencing it or being influenced by it. Techniques to ensure this include randomization, blinding, highly structured protocols, and written or orally administered questionnaires

[57] There have been some critique of an overarching paradigm for what can be deemed 'qualitative research' (cf. Rolfe, 2006:304), but the overall feeling is that a unified outlook is beneficial to the fields in question.

> with a limited range of predetermined responses.

From this summary it is evident that a certain preoccupation with elements, such as the ability to replicate, the understanding of causality, objectivity and operational definitions, exists (cf. Bryman, 1984:77) within the quantitative paradigm – confirming what has been discussed under 4.2.1. The quantitative paradigm, in its broadest sense, rejects the field of metaphysics (Krauss & Putra, 2005:760). The goal of knowledge, in this respect, is simply to describe the phenomena a person experiences – any knowledge beyond that is impossible.

Because this overarching paradigm encapsulates both positivism and postpositivism, and given that postpositivism is now the most dominant form of positivism, the engagement with this paradigm under 4.2.1 can be considered appropriate and sufficient for the quantitative paradigm as well.

With quantitative research being the dominant and most preferred paradigm for scientific research (cf. Krauss & Putra, 2005:760; Healy & Perry, 2000), some extra remarks is warranted about the merits and challenges of qualitative research. Sale et al. (2000:45) summarizes the qualitative paradigm as follows:

> The qualitative paradigm is based on interpretivism and constructivism. Ontologically speaking, there are multiple realities or multiple truths based on one's construction of reality. Reality is socially constructed and so is constantly changing. On an epistemological level, there is no access to reality independent of our minds, no external referent by which to compare claims of truth. The investigator and the object of study are interactively linked so that findings are mutually created within the context of the situation which shapes the inquiry… Techniques used in qualitative studies include in-depth and focus group interviews and participant observation.

John Lewis (2009:2) cites Denzin and Lincoln in their 1998 work – Collecting and interpreting qualitative material – as identifying the present as "the fifth moment for qualitative research."[58]

[58] The fifth moment can be characterized by the prediction Denzin and Lincoln (1998:22) made, stipulating

He speculates that, if they are correct, the way forward for qualitative researchers will be one burdening them with the task of redefining and justifying the validity and reliability of their results. The reason for this is the possibility of allegations that qualitative research can be identified as being undisciplined, sloppy and hopelessly subjective. Lewis (2009:7-10) sets out to delineate certain reliability measures, standards and methods – which will not be expounded upon in this study – but concludes (p. 13) that, in cases where these standards could be adhered to "qualitative research has been proven to be as truthful as quantitative research."

Quite a lot has been written over the last thirty years on the seemingly incompatible nature of the quantitative and qualitative paradigms. Rolfe (2006:2) divides the literature on this issue into three positions:

1. Those who argue that qualitative research should be judged according to the same standards as quantitative research.

2. Those who propose that different standards of judgement are appropriate.

3. Those who draw into question whether qualitative research should indeed be judged based on any predetermined standards.

Hope and Waterman (2003:123) concluded, in this respect, that "the application of criteria, however defined, is not clear, and confusion exists as to how judgements should be made about whether or not a standard has been reached." The prevailing problem remains, Onwuegbuzie and Leech (2005:376) argues, that the *protectors* (purists) of the respective camps focus too readily on their differences, rather than the similarities.

The first and foremost similarity between these two warring perspectives is the fact that both quantitative and qualitative endeavours to address their research questions by way of

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that "more action-, activist-oriented research is on the horizon, as are more social criticism and social critique...The search for grand narratives will be replaced by more local, small-scale theories fitted to specific problems and specific situations."

observation. Sechrest and Sidani (1995:78) elaborates in this respect that both methodologies "describe their data, construct explanatory arguments from their data, and speculate about why the outcomes they observed happened as they did." Two other similarities are the fact that both of these camps use techniques that are analogous to some extent, as well as using similar methods of safeguarding against confirmation bias and other sources that may invalidate a research study (Onwuegbuzie and Leech, 2005:379).

According to Rossman and Wilson (1985, in Onwuegbuzie & Leech, 2000) three schools of thought *evolved* out of the qualitative-quantitative debate: 1) purist, [59] 2) situationalist[60] and 3) pragmatist.[61] These three schools can be viewed as a continuum. With respect to the discussion of Newberg's neurotheology in the previous chapter, this continuum can be regarded as a measuring rod for each perspective that was brought to bare thereon – in other words, each critique or comment comes from a proponent of one of these three schools. However, the scope of this study will not permit the categorizing of the different commentaries used – not that the school from which the critique is made somehow grants the author more, or less authority. It is still meaningful to keep in mind, from what has been shown – as well as what will be delineated in the next chapter regarding language, experience and interpretation – that no one perspective has the definitive say in the matter. Rather, each perspective contributes to a more robust

[59] Purists argue that quantitative and qualitative methods arise from differing ontological, epistemological and axiological views on research, as well as fundamentally different worldviews (cf. for further discussion on the purist stance, Bryman, 1984; Tashakkori & Teddlie, 1998; Collins, 1984)

[60] Situationalists advocate, like the purists, that a paradigmatic – or mono-method – approach carries more weight, but that both methods have value. The value lies therein that the type of research questions that need answering determine the method by which the answer should be ascertained.

[61] Pragmatists contend that the relationship between the two methods can be termed 'a false dichotomy' (Newman & Benz, 1998). The belief in this regard is that quantitative methods are not naturally positivist, and that qualitative methods are not naturally hermeneutic, thus methods can be integrated in a single study (cf. Cook & Reichardt, 1979; Daft, 1983; Miller & Fredericks, 1991; Sieber, 1973)

interaction with Newberg and his model.

4.4. Mixed Method Research

In general, mixed methods research represents research that involves collecting, analysing, and interpreting quantitative and qualitative data in a single study or in a series of studies that investigate the same underlying phenomenon – (Leech & Onwuegbuzie, 2009:265)[62]

Naturally, as has been alluded to already, there are those that have taken part in the qualitative-quantitative debate and argued: why not both? In the years following the height of this debate, some researchers started crafting a new paradigm that encapsulates both the quantitative and qualitative paradigms (cf. Caracelli & Greene 1993). This paradigm has been called several different names (Johnson et al., 2007:118), e.g "blended research (Thomas, 2003), integrative research (Johnson & Onwuegbuzie, 2004), multimethod research (e.g., Hunter & Brewer, 2003; Morse, 2003), multiple methods (Smith, in press), triangulated studies (cf. Sandelowski, 2003), ethnographic residual analysis (Fry, Chantavanich, & Chantavanich, 1981), and mixed research (Johnson, 2006; Johnson & Christensen, 2004)." The most popular terms in use, namely mixed method or integrative research, hold the advantage of incorporating a broader spectrum than some of the other terms named above. Proponents of this paradigm caution against terminology that would limit its research to methodology alone.

A central belief of the mixed-method, as Howe (1988, in Sale et al.,2000:47) describes it, is that truth is a normative concept, and that truth can be understood in terms of what works – this can generally be defined as pragmatism. It seems that only pragmatists, as people who are not normally beholden to either paradigm, would attempt to combine research methods (cf. also, Johnson et al., 2007:113).

Having described and discussed the basic tenets of the two separate paradigms – quantitative

[62] For a comprehensive study of mixed-method research – its utility, foundations, problems, history etc. – please see Teddlie & Tashakkori 2009.

and qualitative research – the arguments for a single integrated study should prove fairly comprehensible. There are four main viewpoints to combine qualitative and quantitative methods according to Sale et al.:

1. It has been put forth that both views share the same logic – thus the same rules of inference apply in both studies – as well as the desire to understand the world.

2. The paradigms seem to be compatible on the grounds of a few shared tenets that Sale et al. summarizes as the "theory-ladenness of facts, fallibility of knowledge, indetermination of theory by fact, and a value-ladened inquiry process" (Sale et al., 2002:46). There is also a utilitarian spirit to be detected, as well as a commitment to improving the human condition.

3. Some fields, such as nursing and other forms of healthcare, are so complex that they require input and data from a large number of perspectives, which could only be facilitated by such a combination of methods.

4. Some scholars argue that epistemological purity will not get any research done. Thus they propose that this debate be seen as a nonsense, in that it is unlikely that any conclusive decisions will be reached in the near future.

Practical reasons for a legitimate combination of the two methods can be described as follows (Sale et al., 2000:48):

1. When it is possible to combine two or more sources or theories of data, it grants the researcher a more complete understanding – by means of what is known as triangulation – of the phenomena under study.

2. It becomes possible for models to be incorporated in a complementary fashion when their strengths are used with the intention of enhancing each other. [63]

[63] Brayman (1984:84) alludes to a possible coarse of complementarity when he describes the task of

In this light, the question has been raised by, among others, Robert Yin (2006), as to when methods can be characterised as "genuinely integrated or merely parallel." After an elaborate discussion of the theory involved, as well as scrutinizing some case studies, he comes to the following conclusion (2006:46): "The design and conduct of a single study involves an array of readily understood procedures, regarding: the research questions being addressed, the definition of the units of analyses, the structure of the samples being studied, the instrumentation and data collected, and the analytic strategies. The more that two (or more!) methods have been integrated into each of these procedures, the stronger the "mix" of methods. Conversely, if each method uses its own isolated procedures, the result will be separate studies using different methods. Though the studies may be complementary, they will not really represent mixed methods research."

In this light, a large number of researchers have started incorporating the mixed-method into their research to obtain and interpret the desired data. However, certain studies have given rise to suspicion when claiming to use both qualitative and quantitative methods, and yet still produced results that agreed or overlapped. The question is posed, how this can be when completely different sets of phenomena are scrutinized? A possible explanation – apart from results being simplified to fit a certain model of understanding – can be that both methods used were, in fact, quantitative. Sale et al. (2000:48) gives the example of a frequency count that is done on responses to open-ended questions and other such studies. They admonish it outright for not being qualitative. It should be understood that it is not always possible or even appropriate to use mixed method analyses. "Indeed, the challenge is knowing when it is useful to count and when it is difficult or inappropriate to count" (Onwuegbuzie and Leech, 2005:381). When considering the merits of mixed method research, especially when usage of the term could grant the researcher a wider readership – from proponents of both the quantitative and qualitative fields – it is imperative to establish clear guidelines, structure and definitions, so as not to misuse this paradigm for undue benefit.

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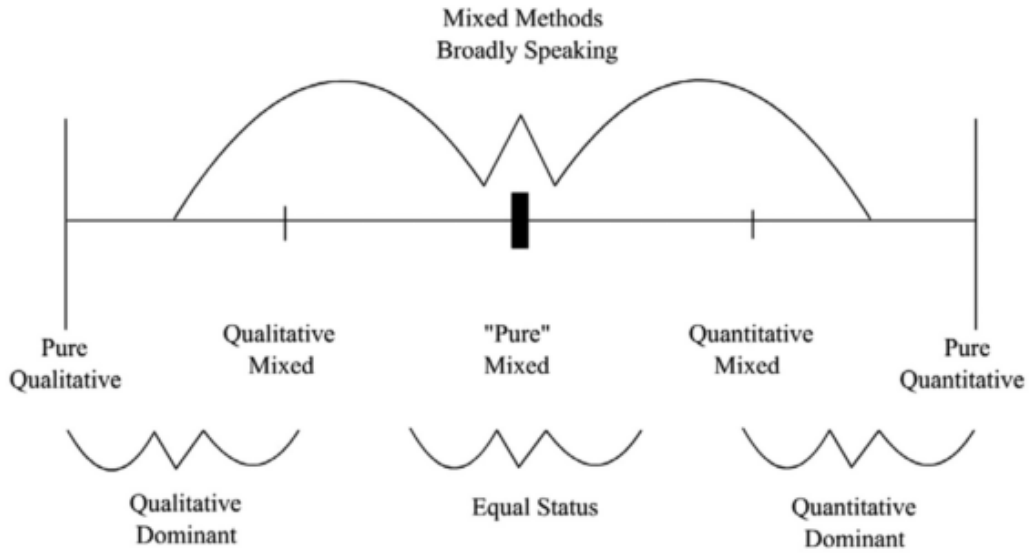
qualitative research to be exploratory, and the task of quantitative research to be explanatory.

In line with what can be understood from Yin's conclusion and the need for guidelines and definitions as argued above, Johnson et al. (2007:124) provides an illustration (Fig.1):

Graphic of the Three Major Research Paradigms, Including Subtypes of Mixed Methods Research



This illustration describes qualitative, mixed-method and quantitative research as part of a continuum. Within this continuum there are several overlapping groups of mixed-method researchers and mixed-method research types. [64]

From left to right, the illustration starts off at the qualitative end of the spectrum – here there is no mixing of methods involved, the research incorporates and retains only pure qualitative methods. [65] Next, as can be seen, a subgroup of the mixed method emerges, termed 'qualitative

[64] Johnson et al. (2007:124) declares that it makes sense for a researcher to have a primary 'home' in one of the three major paradigms.

[65] As has been shown under 4.2.1, a certain methodological perspective indubitably necessitates a corresponding epistemology and ontology as well. Thus as the continuum progresses from this point onward, the ontological, epistemological and methodological presuppositions of the proponents of each

mixed/dominant' – it is neither purely qualitative nor purely mixed. Such research would rely on the qualitative (constructivist-poststructuralist-critical) view of the process of doing research, while recognizing that the addition of quantitative data and approaches can ultimately benefit most of its research. In the centre of the continuum stands the pure mixed-method, where due consideration is given to both qualitative and quantitative prospects. To the right thereof another subgroup of the mixed method emerges, termed 'quantitative mixed/dominant' – as with the 'qualitative mixed/dominant' subgroup, it is neither purely quantitative nor purely mixed. This view relies on the postpositivist understanding of the research process, while recognizing the benefit of adding qualitative data and approaches to its research projects.

An understanding of this continuum – and indeed that it is necessary to speak of these three paradigms in terms of a continuum and not isolated views – would facilitate useful means of evaluating the research being done in any specific paradigm. To complete the discussion, it would be remiss of this researcher not to mention some of the issues and challenges Johnson et al. (Johnson et al., 2007:124-128) deems worthy of pointing out, regarding the mixed-method approach:

1. As research goes through certain stages, it is important to know which stages would benefit, or not, from incorporating mixed-methods.

2. Thus, effective strategies are needed to guide mixed-method integration into research.

3. Clarity is needed on what philosophical framework will best be able to accompany the mixed-method. Pragmatism has been proposed, although the problem of different perspectives on its application need also to be addressed.

4. This begs the question of whether a specific philosophical and methodological framework is actually beneficial to the mixed-method – embracing differences is indeed the sine qua non thereof.

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point on the spectrum will also change.

5. Is it really possible to assign equal status to the use of both qualitative and quantitative epistemologies? Some scholars suggest, in this respect, that mixed-method research is only possible when a dominant paradigm takes the lead.

6. Credibility, trustworthiness and validity is a central concern for the mixed-method. A great number of typologies and standards have, out of necessity, been put forth by methodologists to guide this specific issue.

7. The question is asked if the three variants of the mixed-method (qualitative-dominant, equal-status and quantitative-dominant) should be more fully developed and differentiated, as well as how this may be done.

8. In terms of the possibility of a fully developed contingency theory[66], answers need to be sought for the question: when, and under what conditions, should either qualitative, quantitative or mixed-method research be considered the appropriate approach.

9. A fuller definition of mixed-methods may need to incorporate and expound upon the logic behind such research – to combine different paradigms of research in a way that "produces complementary strengths and nonoverlapping weaknesses" (Johnson et al., 2007:128).

10. The question arises if the mixed-method field will be able to create a typology of research designs that could in general be agreed upon.

4.5. Conclusion: Paradigm-theory and Newberg's Neurotheological Model

From what has been said in the present and previous two chapters – taking into account what has been said about Newberg and his model, as well as what Newberg himself has said – Newberg can be classified as a constuctivist/pragmatist (cf. Forster, 2006:128). This categorization of Newberg – and his model for neurotheology – sheds some light on his fervent undertaking to

[66] As it pertains to the pragmatic utilization of different paradigms in order to do research.

establish neurotheology as a research discipline in its own right. That being stated, it is still necessary to delineate the inherent arguments in making such a statement, as well as to properly articulate the subtle nuances of Newberg's unique approach.

According to Onwuegbuzie and Leech (2005:376) constructivists/pragmatists and purists reside on opposite sides of the mono-/multimethod spectrum. That should give us a good indication of the implicated paradigmatic loyalties and nuances.

It has already been said that Newberg cautions against any scientific or theological bias when doing neurotheology – no ontological priority should be given to either the material universe or to God – as this field of research is not beholden to either science or theology. This *a priori* principle alludes to the relativist characteristic of the constructivist ontology. In this light one can attempt to articulate Newberg's view of causality regarding RMS experiences.[67] When taking into account his 'wherever it might lead', relativist stance, it comes as no surprize that his personal perspective can be expressed as: our brain either creates RMS experiences in response to external stimulation (thus affirming the apologetic approach to neurotheology), or it creates RMS experiences as an epiphenomenal function of the brain itself (thus affirming the reductionist approach to neurotheology). In the meantime, with no conclusive evidence as to the prior or latter possibility[68], he perpetually endeavours – as can be expected of a religionist-integrationist – to keep these two perspectives in a creative tension.[69]

This mode of research safeguards against any temptation to deconstruct and assimilate either

[67] Clarity on this point will be of great importance when proposing the possible parameters of interaction reformed theology might establish with his neurotheology.

[68] Brain scans, no matter how sophisticated, are unable to distinguish between the brain creating an experience, or the brain responding to an experience.

[69] This begs the question, what would neurotheology have to prove to illicit a paradigm-shift from either the neurosciences, or theology? It also alludes to the question of what specific function neurotheology provides its constitutive counterparts?

theology or neuroscience into a forced model. It also enforces complementarity between its constituent parts – e.g. neurotheology can be thought of as both a branch of Neuroscience, in which the focus is on the neuroscientific study of religious phenomena, while, at the same time, it can be thought of as a branch of Theology, in which the impetus rests upon neurologically informed theological reflection.

The creative tension mentioned above can thus be characterized as the 'soundboard' for Newberg's 'neurotheological hermeneutic',[70] in the sense that it perpetuates a balance between the two inherent universal elements, namely, the perspectives on the human brain and religion. In this respect, it can be argued that the neurotheological hermeneutic obintes the ontological-epistemological distinction. This can be argued on the basis that the inquirer produces representationalist constructs about the 'inquired into' – that which is 'out there' – and that any findings in this respect are deemed the product of interaction between these two entities.

Pertaining to Newberg's methodology, in which the neurotheological hermeneutic is prevalent, his subjectivist epistemology actually complicates any data he might produce. The epistemological isolation produced by his neurotheological hermeneutic necessitates a (pragmatic) shift to qualitative dominant, or quantitative dominant research methods of data interpretation to bring research issues to conclusion. This fluid methodological position alludes to a strong mixed-method approach.

Critique of his methodology, as well as the meta- and megatheology it strives to create, has been done on account of the fact that an experientialist approach cannot do justice to the complexity of religious phenomena, as well as the views its proponents hold. Pertaining to the relationship between neuroscience and neurotheology, and between religion and neurotheology, the question has been posed: how can these two research fields take neurotheology seriously if, as

[70] The neurotheological hermeneutic, as have been described in chapter 2, follows from the philosophical standpoint Newberg terms 'experientialism'. This is the notion that all thinking, emotions and ideas are tied to human experience, that all experiences are implicated by the systemic working of the mind and brain, and that the working of the mind and brain are always restrained by a pre-processed view of reality.

a constructivist paradigm, it deems them as completely flawed in terms of their paradigmatic assumptions?[71]

To conclude this chapter we look to what has been done up to this point and how that casts light on the coming chapters. Newberg's neurotheological model has been categorically paced in Brandt's four perspectives/dispositions on neurotheology – seeing traits of what he describes as religionist, as well as integrationist perspectives in Newberg's handling of this field. In this chapter Newberg's paradigmatic underpinnings has been extrapolated from the description of his model in chapter two, as well as from the critical engagement in chapter three With this information he has been categorised as a constructivist/pragmatist, in light of the correlation with Guba's description of the relativist ontology, subjectivist/transactional epistemology and hermeneutical and dialectical methodology inherent in this paradigm. His nuanced usage of the mixed-method approach has also been described.

The next chapter will endeavour to describe and discuss, on the one hand, a contemporary model for neuroscience that enjoys considerable consensus, as well as for reformed theology on the other. These two models will then be categorised, as has been done with Newberg's neurotheology, with regards to Brandt's four categories, as well as their paradigmatic position on the quantitative-qualitative continuum. A possible model for interaction between these two fields will then be discussed. When all of this has been accomplished, chapter 6 will have enough information to define the parameters within which neuroscience and reformed theology may interact with Newberg's neurotheology, without having to cross their own paradigmatic threshold.

[71] As Guba (1990:25) depicts the four reasons for this perspective: 1) all facts are theory laden, 2) all theory is underdetermined, 3) all facts are value laden and 4) there is no escape from the dyadic nature of an inquirer/inquired-into relationship.

Chapter 5 – Contemporary Models for Neuroscience and Reformed Theology

5.1. Introduction

This chapter will engage to the two questions posed in the title of this study: What science? Who's theology?

Evident in these questions is the assumption that there exists multiple views on what science is exactly, as well as the fact that there are a multitude of religions, generating a multitude of theologies. Newberg's aim for his neurotheological model, is that it will be able to facilitate some form of reconciliation between science and religion (cf. Dinis, 2008:85). The critique in chapter three of Newberg's model, however, should be enough reason to see the merits of the two questions posed above. When proposing an integration of science and theology on the basis of his neurotheology, Newberg has clearly acted on a very specific understanding of science and theology, and from there his assumption came that an integration would indeed prove possible. The problem with this assumption is exactly the fact that an integration-interaction model is put forth on the basis of a specific understanding of science and religion, respectively (cf. Barbour, 1997:103).

It would seem, from all that has been said, that Newberg's model and consequent aspirations, generally holds the most threatening implications for religion – especially if his representation of religions and religious experiences were possibly proven true. Dinis (2008:78) writes in this regard that, "the first assumption of neurotheology is an internalist and individualistic view of religious experience that underestimate the importance and correlation that exists between personal religious experiences and external factors, namely a tradition, a community of faith sharing and the more practical aspects of most religious traditions such as the 'golden rule': love your brothers as you love yourself." In this light, Dinis (2008:85) further argues that Newberg and his colleagues consistently operate within the parameters of neurotheology, but with a very disputable view of what counts as an RMS experience.

It is clear that Newberg's pragmatism allows him to effectively oscillate between his general understanding of science and religion in terms of their respective paradigms of inquiry, toward fulfilling his neurotheological aspirations. This is in line with his neurotheological principle stated in chapter 2: "Neuroscientific and theological perspectives must be considered to be comparable contributors to neurotheological investigations" (p. 23). However, for neurotheology to be considered a comparable contributor to neuroscientific and reformed theological investigations, it needs to be shown to what extent a contemporary understanding of these two fields of investigation can be taken seriously by Newberg.

In this light, it is of paramount importance to ascertain on which grounds scientific and religious integration has been deemed possible – in other words, what scientific and religious interaction-model has proven to be most collaborative. This could then be regarded as a framework for evaluation. Furthermore, it would serve the purpose of this study to use this framework in evaluating how a generally accepted neuroscientific model, as well as a reformed theological model – that is deemed representational of responsible reformed-theological reflection – correlates with and contributes to the religio-scientific view of an integrated model. Then, finally, this correlation can be used as a framework to evaluate to what extent Newberg's model fits into the scope of a possible integration, where the integrity of both science and theology are kept in tact.

To accomplish this, the present chapter will firstly elaborate on Barbour's four interaction models, ending with the integration-interaction model. This section will specifically be focussing on what understanding of science and theology facilitates an integration. Chapter 2 has already spent some time on describing Newberg's own stance toward the four possible interaction-models, but there was no thorough explication of what specific scientific and religious views would merit his chosen stance. To provide a framework for evaluation of his model, it would be necessary to show on which grounds there could be integration between science and religion, and if his view thereof can fit into the framework. Barbour's integration-interaction model will

then be used to evaluate Newberg's use of science and theology in his own integration model. [72] Next a contemporary understanding of the foundational principles of neuroscience and reformed theology will be expounded upon respectively. These models will then be used in a comparative capacity with regards to the scientific and theological foci of Newberg's neurotheology.

5.2. Some Ways of Relating Science and Religion

"Science seems to provide the only reliable path to knowledge. Many people view science as objective, universal, rational, and based on solid observational evidence. Religion, by contrast, seems to be subjective, parochial, emotional, and based on traditions or authorities tat disagree with each other." – (Barbour, 1997:77)

Throughout modern history, especially since the scientific revolution, there have been considerable discussions and arguments on the topic of how science and religion should be related. Ian Barbour delineates fourfold typology of interaction (conflict, independence, dialogue and integration) which he deems as the most encompassing of the major attitudes toward this topic.[73] Of specific interest in this part of the study are the nature of the scientific and religious views which lead scholars to become proponents of one of these interaction models.[74]

Conflict

The conflict model has been influenced by much more than viewing science and religion in isolation. Historical and political agendas have given rise to the wide, and sometimes uncritical,

[72] The question will be asked if Newberg's rendering of science and theology correlates with Barbour's integrational view.

[73] There are some scholars who are of the opinion that this typology is not very useful, especially in providing historical background for the interaction of science and religion (cf. Cantor & Kenny, 2003:765). However, for the purpose of this study a historical discussion within the typology will not be necessary.

[74] There will be an engagement with the models at the end of this section.

acceptance thereof. Barbour turns our attention to Galileo and his conflict with the Roman Catholic Church. He blames the conflict on contextual conditions that no longer apply, such as the authority of Aristotle and political agendas driven by the threat of the reformation. He further points to Darwin, elucidating the fact that both the theological and scientific responses were far more nuanced than the image of warfare between two conflicting entities produced by popular media (1997:77). [75] The same can be said for the view of the debate between the so-called *new atheists* and apologists of today.[76]

The view of science and religion in this interaction model can be described as scientific materialism over and against biblical literalism.

Barbour (1997:77) is of the conviction that these two extremes share a few commonalities:

- Both believe that there are perpetual conflict between a contemporary scientific view of the world, and a classical religious view.

- Both seek to acquire knowledge with a sure foundation – the one by means of logic, the other by means of infallible Scripture.

- Both claim to make rival statements about the same domain, e.g. the history of nature.

Barbour believes that the reason for this conflict rests on both parties' misuse of science (1997:78). He states that the scientific materialist starts from the point of science, and then ends up making broad philosophical statements, e.g. the origin of the universe and the redundancy a

[75] David Hart, in his book *Atheist Delusions* (2009), identifies and expounds upon a number of popularly used examples throughout history that continuously perpetuate the conflict model. He argues, in line with Barbour, that there are a vast number of variables to take into account, regarding each of the historical examples, rather than just the perennial mantra of *science versus religion*.

[76] Some of the most popular authors in the New Atheist movement include, Richard Dwakins (*The God Delusion* [2006]), Christopher Hitchens (*God is Not Great* [2007]), Sam Harris (*The End of Faith* [2004]) and Daniel Dennett (*Breaking the Spell* [2006]).

theistic God. As for the biblical literalist, the road goes from theology toward making scientific conclusions, e.g. the age of the universe, events that shaped earth's geology. This needs to be explicated some more.

The standard scientific materialist subscribes to two very basic beliefs:

1. The scientific method can be regarded as the only legitimate way of gaining knowledge of reality.

2. The fundamental reality of the universe is matter and energy.

From what has been discussed in chapter four, these statements can be viewed as the epistemological and ontological positions of the scientific materialist. Inherent in these statements are the fact that only science can successfully study and explain the nature of reality.[77] As has already been described, this can be regarded as the reductionist/empiricist position.[78] One of the primary tenets of this view, that has not been explicitly named, is the belief that a study of the constituent parts of any system would naturally lead to understanding its most fundamental reality – as opposed to a study of higher levels of organization (the study of complexity).

Biblical literalists argue for the infallibility of Scripture and thus the claim of a mechanistic inspiration of Scripture by the Holy Spirit – this mechanistic inspiration theory can be thought of as anything short of God physically writing the Scriptures. Hence, the epistemology and ontology of Biblical literalism are dictated by the specific hermeneutical approach to the content of

[77] In some circles this assertion has been termed scientism (Barbour, 1997:81; cf. Stenmark, 1997:15 for a disambiguation of the term *scientism*).

[78] Tom Sorell (1991:4) delineates five underlying assumptions he deems to be at the heart of this position: 1) Science is unified, 2) there are no limits to science, 3) science has been extremely successful at predicting, explaining and controlling, 3) scientific methods confer objectivity on scientific results, and 5) science has been extremely beneficial for human beings.

Scripture.[79] This is a strong representation of the apologetic view discussed in chapter three.

This view of Scripture has had a long history, which nearly always surfaced in a time of "moral confusion and rapid cultural change" (Barbour, 1997:83). From this view has also sprang an argument for a new attitude toward science, called *scientific creationism* or *creation science*. This view argues that there are scientific evidence for the Biblical narrative of creation, and subsequent narratives, such as the universal flood, the sun's motion being suspended for a whole day, the ten plagues of Egypt etc. Such conviction can be regarded as an absolutist outlook on reality, which leaves little to no room for scientific discovery – because it is believed, and I say this in a caricaturist fashion, that everything that can be discovered about the world is already written down in the Bible.

Independence

One way around the problem of perpetual conflict between science and religion is the view pioneered by Stephen Jay Gould (1997:16) that science and religion actually have nothing to do with each other. In this respect he coined the phrase, Non Overlapping Magisteria (NOMA). This proposition views science and religion as two distinct and autonomous fields, each with its own methods and justified on their own terms. The NOMA proposition has been defended on two different fronts: 1) on the grounds that this will inhibit any possible conflict, as well as 2) to preserve the distinctive character of each field (Barbour, 1997:84).

Barbour (1997:84) explicates this interaction model in terms of two differing claims made by its proponents, namely, 1) that science and religion have vastly different methodologies, and the other, 2) that the language used by them fulfils very different functions for human life.

[79] Corley et al. (2002:XV) states, with empathy, that people who are "committed to living under the authority of Scripture want to be sure that they grasp its teaching" – it is with this mindset that biblical literalists sometimes ferociously hold to their view of Scripture. This view of Scripture is discordant with what Thiselton (1977:308) believes biblical hermeneutics should facilitate, i.e. the Word of God becoming a living Word we hear anew.

Barbour explains that there are many conservative Christians that hold to the spiritual truths of the Bible, without being literalists or proponents of creation science. The Christian faith, for them, answers the question of why, whereas science answers the question of how (1997:85). Science is thus not threatening, nor supportive of their religious claims. Although some have pointed out the limitations of science – e.g. explaining the origin of life, the universe, or consciousness – and proposed a natural theology arguing for design, science and religion are essentially two independent domains of life in this view.

A case for methodological divergences has been made on account of faith depending on divine initiative and self-revelation, whereas a scientific – or even natural theological – approach relies on fallible human reason and discovery. It is also proposed that science and theology operate on differing subject matters – God's action takes place within the sphere of history and not nature, therefore theology is to inquire into history and not nature. In light of all this, science and theology are free to go their separate ways. In this model, in terms of the theological stance, the Bible is not seen as revelation in and of itself, but rather human recordings and interpretations of revelatory events. Here, Biblical narratives taken as gospel by the so-called creationists, are seen as a symbolic portrayal of the relationship between God and humanity.[80]

This stance is also strongly reminiscent of existentialism[81] (1997:86) – the fact that certain things (like personhood) can only be experienced by a subjective involvement, while others (like impersonal objects) can only be known by objective detachment. Religious existentialists maintain that God can only be encountered through a personal relationship, not by a detached

[80] The essence of this theological view is that religious meaning, when received today, is no longer bound to the ancient cosmology in which is was conceived. Hence, the importance of suitable hermeneutics, which will be discussed in section 5.5.

[81] "Man is nothing else but what he makes himself." This is how Jean-Paul Sartre articulates the first principle of existentialism, hence likening it to subjectivism. Existence, for Sartre, is the foundation of human life, from this springs the *essence* – what one creates or wills for one's life (cf. Sartre, 1984:324-325).

analysis.[82]

In terms of the argument of differing languages, Barbour deems it the most effective way to separate science and religion. If science and religion are seen as different languages – or "language games" as Wittgenstein termed it (cf. Wittgenstein, 1953) – they will never be unrelated, because their functions will not be alike – in other words, science and religion are in different functional categories which cannot be viewed in a relatable sense. The language of science, thus, is given a specific function – to summarize data, correlate regularities in observed phenomena, and produce applications in technology, among others. To expect science to provide us with a worldview, a set of ethical norms or a proper way of life, would be asking it to overstep its primary function – this would be the function attributed to the language of religion.

Dialogue

The dialogue interaction model serves as an intermediary position between the independence and integrative models – science and religion are not as divergently portrayed as in the independence model, but they are also not as close as they are in the integration model. Dialogue, Barbour explains (1997:89), moves from the approximation of the general characteristics of science and religion, rather than from specific theories. He structures his discussion around three points, which will be briefly expounded upon below:

1. Presuppositions and limit questions

Limit questions, or boundary questions, are questions that cannot be answered by the methods of science. Barbour states that certain theologians argue, to some extent, that theism is an implicit presupposition for doing science – based on the contingency and intelligibility of nature (Barbour, 1997:90). Science arose from within a religious context, fixating on answering the questions related to an intelligible and rational universe. In this light, it has been argued by

[82] Kierkegaard proclaimed the subjectivity of truth and faith, over and against objective certainty, especially when dealing with the truth about, and faith in God (cf. Smith, 2012:811)

authors such as Ernan McMullin (1987), as Barbour points out, that, on its own level, the scientific account of reality is complete and without any gaps. However, this is because science is only equipped to study secondary causes, Barbour states (1997:89), through which God, as primary cause, acts.

This position is also opposed to all attempts in deriving arguments for God's action and existence from unexplained scientific phenomena (the so called God-of-the-gaps theory [cf. Harris, 1963]). It is the contention of the researcher that the fact that God exists and is personally involved in God's creation, should always be an *a priori* assumption[83] for the theologian, regardless of scientific theories opening or closing a *gap* to prove this. The scientific and religious view of the dialogue model will not allow a scientific theory to be used as support for a Christian doctrine or vice versa. Barbour does however argue the value of reforming certain doctrines – that are clearly historically conditioned – in the light of scientific discovery, e.g. the doctrine of creation.

2. Methodological parallels

To the positivists, as has been discussed, science seemed like and objective discipline, whereas religions seemed subjective. Since the 1950's this distinction became less and less absolute on account of scholarship becoming aware of the theory-ladenness of all data. Data are conceptionally interpreted by means of imagination and analogy. Due to the hiddenness of a great part of our world, there analogies are the most reliable sources from which to understand reality. It seems to be the case for religion as well, Barbour states (1997:92), when the usage of metaphors and models in religious language are brought to mind – the object of religion, God/Ultimate Reality is similarly hidden from us.

He also likens the paradigm-bound element of a scientific community to that of a religious community, and argues that being paradigm-bound may even be more so for theology, than for science. He bases this argument on the fact that theological paradigms are extremely resilient to falsification, due to a greater use of ad hoc assumptions when confronted with anomalies

[83] Section 5.5 will explain why this assumption should be normative for the theologian.

(1997:92). In other words, since theology is largely an abstract field of reflection, the theories and theological constructs could (should?) be rearticulated quite easily.

The dialogue interaction model also affirms the change that has taken place regarding the role and status of the observer within inquiry – effectively endorsing a critical realist stance toward inquiry. Michael Polanyi (1958) has stated that, on these grounds, a methodological harmony covering the whole range of knowledge can be deemed possible, whereas the theologian may be counted with the critical realists as well. John Polkinghorne endorses this view on the grounds of the methodological similarities that exist between the fields of science and theology. He is of the mind that "each is corrigible, having to relate theory to experience, and each is essentially concerned with entities whose unpicturable reality is more subtle than that of naïve objectivity" (1987:64).

Barbour (1997:93) cautions the use of the dialogical interaction model on account of three possible problems – these cautions would be very important for the evaluation of Newberg's model under 5.3.

a. Although it has been accepted that scientific data are not theory free, he argues that science is still not as subjective as theology. Data from both of these fields are from immensely different sources, and there is a greater limit placed upon the testing of religious beliefs.

b. In order to overcome the absolute distinction between science and religion – as is described in the independent interaction model – the tendency to treat religion as nothing but an intellectual system should be avoided. Religious belief should never be taken out of the context of a religious community or, as Barbour describes it, the goal of personal transformation (1997:93).

c. Methodological issues have a tendency to become very abstract and, as Barbour points out, "might be of more interest to philosophers of science and philosophers of religion than to scientists or theologians and religious believers" (1997:93). In recognizing methodological similarities, the possibility arises to view theology as a reflective

enterprise, capable of growing and developing and open to new insights.

3. Nature-centred spirituality

A nature centred spirituality stands in contrast to the philosophical approach of the authors discussing the limit questions (Barbour, 1997:95). Proponents of this view have described the experience of a religious dimension to nature within their work. This experience is not beholden to any specific religion, but it does invoke a deep sense of awe in those who hold to this type of spirituality.[84] It is from this sacred experience of nature that its proponents express a deep commitment to social justice and environmental ethics. This view also alludes to the New Age Movements that combine an interest in harmony with nature, meditation, and an array of supposedly scientific claims, as well as a more holistic approach to inquiry (cf. Wilber, 2001).

A dialogical approach, for some, is born of the belief that in all of science there are certain elements of sacredness not reducible to phenomenal objects. Likewise with religion, the belief stands that there are concrete elements underlying the abstract nature of its inquiry and practise. Barbour (1997:97) professes his sympathy for the spiritual hunger of a materialistic culture, as well as the endemic dissatisfaction people have with traditional institutions[85], be it science or religion. In this light there are those who would be open to more inclusive paradigms of inquiry, which stretches the conceptual boundaries of acceptable science and religion.

Integration

Advocates of a more direct integration of scientific and religious content believes in a particular correlation between scientific theories and religious doctrine. Barbour (1997:98ff) clarifies that there are three main versions of interaction, which will be expounded upon briefly:

[84] One such example can be found in the person of Bede Griffiths (cf. Trapnell, 2013:18).

[85] A good example of this would be the description of the 'nuclear man' in Henri Nouwen's The Wounded Healer.

a. Natural theology

The short description of natural theology is this: science demonstrates (unintentionally) that there is evidence of design in nature. With this evidence, natural theology infers the existence of God.

Some of the arguments from the perspective of a natural theology include: Thomas Aquinas' First Cause or Cosmological argument (cf. Aquinas, 1990), as well as his teleological argument for the structured nature of natural phenomena. William Paley (cf. Paley, 1803) put forth his argument for design on the basis of the complexity in coordination of a single function like the human eye. Richard Swinburne argues the plausibility of God's existence on the basis of science's confirmation theory.[86]Most recently the argument for design came in the form of the Anthropic principle (cf. Bostrom, 2002:5f) – the argument that, for life to exist, there had to be a significant amount of specific conditions in the early universe, if the expanse theory is taken into consideration. For each of these advocacies for design a counter argument has been made, although most of the debates that follow are done so by purely theoretical, philosophical and abstract means. There are other arguments to bolster this perspective, but those that have already been mentioned will suffice.

b. Theology of Nature

The short definition of a theology of nature can be construed as follows: sources of theology are mainly found outside of science, but certain doctrines can be reformulated in accordance with some scientific theories.

Over and against a natural theology, a theology of nature starts from the religious tradition and experience, and moves from that perspective to science. Science and religion are mostly viewed as independent sources, but with some areas of overlap. It is because of these overlapping areas

[86] This is the theory that every theory has an initial plausibly. The addition of evidence contributes to the probability that the theory is true, but not that the theory is absolutely true (cf. Crupi, 2013).

that some theologians deem it necessary to reformulate certain doctrines. The prime example would be to let the current understanding of nature and natural processes inform the theological description of God and humanity's relation to the natural order. Proponents of this view, such as Arthur Peacocke, posit that theological reflection should take place within a past, present and ongoing theological community.[87]

c. Systematic synthesis

A systematic synthesis can be succinctly described as: the movement towards an inclusive metaphysics[88] (or ontology) by means of both scientific and religious contributions.

Process philosophy is deemed the most promising prospect for mediating a systematic synthesis between science and religion. Biology and physics plays a major role in characterising nature as predominantly in a state of constant change, driven by chance and inclined to novelty as well as order. God is the source of this system and is intimately related to its workings. God is both transcendent and immanent in the world, operating by persuasion and not compulsion, "unchanging in purpose and character, but changing in experience and relationship" (Hartshorne, 1948 in Barbour, 1997:103). Furthermore, process thought stands over and against reductionism – as reductionists tend to work with the parts and not the whole – and is inclined to a view from complexity (top-down) in operational systems. It also opposes a Kantian dualism and endorses the dual aspect nature of all events – these terms are used in the sense it was described in chapter three.

With the evaluation of Newberg's model in mind it would be beneficial to point out Barbour's

[87] Cf. Arthur Peackocke's, *Paths from science toward God* (2001), for further reading on a theology of nature.

[88] Barbour (1997:103) defines inclusive metaphysics as "the search for a set of general categories in terms of which diverse types of experience can be interpreted."

remarks on an the different interaction models, and specifically the integration-interaction model. He tends to agree with a theology of nature, coupled with a nuanced use of process thought. This coupling is used to discourage too much reliance on science which would undermine the important experiential aspect of religion. At the centre of Christianity Barbour sees an experience of reorientation, healing toward a new wholeness, and a new expression of our relationship toward God and the proverbial "neighbour" (1997:105). Thus, he commends the existentialists and linguists for pointing toward the primacy of social and personal life in religion, as well a the neo-orthodoxy for rightly aligning the Christian community with the person of Christ as the source of all change in life (1997:105). In light of his alliance to a theology of nature, Barbour urges us not to belittle the created order on account of redemption from the world – rather to endeavour to be redeemed in and with the world (1997:105). In this regard a theology of nature will have to draw from both religious and scientific sources. He posits that using a systematic metaphysics could lead toward a coherent vision (synthesis), but cautions that religion should never be reduced to a metaphysical system – distorting scientific or religious ideas to fit this synthesis is not the aim, but rather keeping the rich experiential diversity in mind. "A coherent vision of reality can still allow for the distinctiveness of differing types of experience" (Barbour, 1997:105).

5.3. An Evaluation of Newberg's Integrational Presuppositions

In light of Barbour's description of, and remarks on these four interaction models, it should be possible to adequately place Newberg's neurotheological model within its scope. This is done to further ascertain what type of interaction between science and religion Newberg foresees.

With regards to the field of neurotheology, it has been established in chapter three that Newberg functionally operates from within a religionist and integrationist view of science and religion. From a paradigmatic vantage point, it has been shown in chapter four that Newberg operates as a pragmatist. The establishment of these inherent characteristics of Newberg's dealing with science and religion provide us with a useful framework. This framework will now be used to compare and contrast Newberg's use and understanding of science and religion to that of the four views described above.

As a religionist – in line with what has been said in chapter three – Newberg subscribes to the belief that all natural phenomena should and can be studied scientifically. Over and against the reductionist view, he does not believe that legitimate metaphysical inferences can be made as a result of this study. However, this does not inhibit him from creating some explanatory scenarios in terms of causality, be it predominantly scientific or theological. This characteristic of Newberg's view is in line with what Barbour described as the dialogical interaction model's handling of the limit/boundary questions in science and religion – science is only equipped to inquire into secondary causes. In correlation, Newberg withholds from trying to 'fill the gaps' of science with God, as well as not prematurely 'closing the gaps' with scientific reductionism. Furthermore, it seems that Newberg correspondingly operates with an approximation of the general characteristics of science and religion, at least as he sees them, and is not beholden to actual contemporary theories or models – in other words, there does not seem to be a blatant misuse of scientific data to support any specific religious doctrine.

In placing Newberg among those with an integrationist stance toward science and religion from the perspective of neurotheology, he is clearly of the mind that science informs theology on a fundamental level. This implies that he believes it necessary for religious traditions to reformulate some of their theological doctrines on the basis of his neurotheological discoveries, as has been shown previously (p. 42-43). This stands over and against the apologists view that science validates theology. It is all clearly in accordance with what Barbour describes as the integrational model's 'theology of nature' -- science informing religion. This conclusion is also strengthened by the fact that Newberg predominantly operates within an empirical sphere of inquiry, as theological sources fall outside the realm of empirical validation. Newberg's integrationist stance aligns him with some aspects of a systematic synthesis as well. This claim is made with reference to his adherence to the dual-aspect view of personhood, as well as his aversion to scientific reductionism – at least in his mind. Although, he wouldn't fit within a systematic synthesis completely, this researcher believes that he could find an accord with Barbour's nuanced view thereof.

As a pragmatist, Newberg believes that, for his neurotheology to function properly, no

ontological priority should be given to either science or theology (2010:145). If he is beholden to the pragmatist's relativist ontology and subjectivist epistemology, it is understandable that science and theology's distinct characteristics and operational paradigms present a problem. Again, the pragmatist account of inquiry assumes an integrational stance. This argument is based on Barbour's exhortation under the 'theology of nature' approach, that both scientific and religious sources should be taken seriously. Pragmatism can, in fact, be seen as an overarching model that, to some extent, could find a positive use for each of the four perspectives on scientific and religious interaction.

When taking into account all that has been said in this section, a few critical remarks remain. Newberg's handling of science and theology in general terms, rather than abiding by specific theories, is reminiscent of his endeavour to unite all religions and spiritualties within a megatheology. The problem with this is that it has little to no real-world application for the plethora of different and divergent RMS phenomena and the beliefs couples with them, as well as not taking their unique features seriously (cf. Jeftic, 2013:274). Similarly, in showing science and theology that it can co-exist in a dialogical or even integrated fashion on the basis of its most fundamental characteristics, leaves the problem that religion could be forced into becoming just another reflective enterprise – devoid of its inherent personal and relational character.

It is with this in mind that an evaluation is deemed necessary by two contemporary models, one from science and one from theology.

5.4. Towards a Contemporary Understanding of the Foundational Principles of Neuroscience

> How does the brain—an organ weighing only three pounds—conceive of the infinite, discover new knowledge, and produce the remarkable individuality of human thoughts, feelings, and actions? – (Kandel et al., 2013:3)

In recalling Blume's (2011:307) reference from chapter three – that there is no single perspective on the human brain – a choice will have to be made. Since it has been shown that Newberg is not

beholden to a specific neuroscientific theory or model, this section will endeavour to delineate the characteristics and nuances of such a model, proposed by authors that is currently deemed most representative of their field. Although there are many different areas of study[89] that can be grouped under neuroscience, the one area that provides neurotheology with the most leverage, due to the abstract and theoretical nature of its conclusions, is that of cognitive neuroscience. As has been said in chapter three, Newberg's epistemology is not significantly novel among the other cognitive sciences (Barrett, 2011:135), it is his methodology and the inferences he draws from them, [90] as Ladd & Ladd pointed out, that raises caution. For this reason the focus of this section will consist of a basic description of Kandel et al.'s (2013) model of cognitive neuroscience, as it relates to the functionality of the brain in behaviour, as well as consciousness. Moreover, reference will be made to the methodology used in their research.

An Introduction to Some Important Research Topics of Neural Science

The ultimate challenge for the biological sciences, as Kandel et al. (2013:5) puts it, is "to understand the biological basis of consciousness and the brain processes by which we feel, act, learn, and remember." This is the area of neural research that strives to unify the study of behaviour and neural science. Such a unified approach – in which body and mind are not viewed as separate entities – Kandel et al. states, is built upon the basis of all behaviour being the result of brain function (2013:5). This entails that, what is called "the mind" is in all actuality a "set of operations carried out by the brain" (Kandel et al., 2013:5). A corollary of this view is that a disturbance of brain function will similarly be the reason for all behavioural disorders, characterized as psychiatric illness – affective (feeling) as well as cognitive (thought). At this juncture the question of the localization of brain functions comes to the fore.

[89] i.e Developmental, cognitive, molecular, behavioural and clinical neuroscience etc.

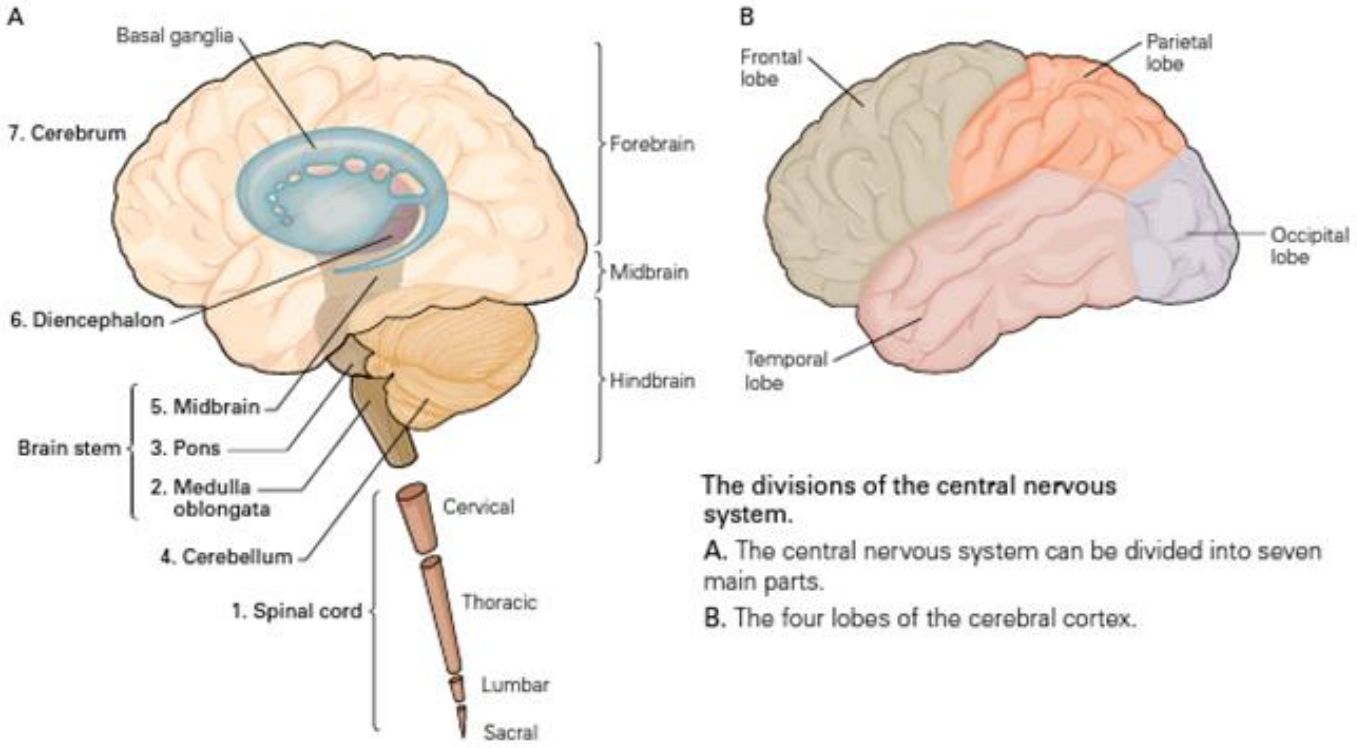
[90] Forster (2006:128) points out, in this regard, that a great deal of d'Aquili and Newberg's early conclusions have been done on account of inductive reasoning. In Chapter four, Barbour has pointed out the limitations of this type of scientific reasoning.

A functional view of the relationship between brain and behaviour

Modern views about the brain, its nerve cells and the behaviour it elicits, emerged during the mid twentieth century from a synthesis of several experimental traditions, i.e., molecular biology, neuroanatomy, electrophysiology, and cell and developmental biology (Kandel et al., 2013:333). As a result, the modern science of mind came into being as an autonomous research field, on account of a pragmatic attempt to merge cognitive psychology with neural science. "The aim of the new science of mind is to examine classical philosophical and psychological questions about mental functions in the light of modern cell and molecular biology" (Kandel et al., 2013:333). This is indeed a bold undertaking. Kandell et al. stipulates that a reductionist approach to mental functions – especially the major functional systems in the brain, i.e. sensory, motor, motivational, memory, and attentional systems – has, so far, produced considerable progress toward a better understanding thereof.

In order to appreciate the biological basis of these functional systems, an understanding of the subservient anatomy is required. Here is a standard model of the brain that Kandell et al. put forth:

(Fig.2) – Kandel et al. (2013:9)



The divisions of the central nervous system.

A. The central nervous system can be divided into seven main parts.

B. The four lobes of the cerebral cortex.

The seven main parts of the central nervous system carry out the following functions:

- Spinal Chord: this region receives and processes sensory information from the bodies limbs and trunk, as well as controlling its movement.

- Brain Stem: the brain stem receives and processes sensory information from the head, as well as controlling it motor functions. It further conveys the information between the brain and spinal chord, as well as regulating arousal and awareness levels.

- Medulla Oblongata: this organ is responsible for several autonomic functions, i.e., digestion, breathing and control of the heart rate.

- Pons: information about movement is conveyed through the pons, from the cerebral hemispheres to the cerebellum

- Cerebellum: this region regulates the intensity of movement, as well as being involved in acquiring motor skills.

- Midbrain: controls sensory and motor functions like eye movement and coordinating visual and auditory reflexes.

- Diencephalon: two structures are contained within the diencephalon: the thalamus processes the information entering the cerebral cortex and the hypothalamus regulates autonomic, visceral and endocrine functions.

- Cerebrum: this organ is comprised of two cerebral hemispheres, has an outer layer (cerebral cortex) and three deep-lying structures (the basal ganglia, the hippocampus, and the amygdaloidal nuclei). The cerebrum is divided into four distinct lobes: frontal, parietal, occipital, and temporal as shown in figure 2B.

In light of this illustration, Kandel et al. (2013:337) emphasizes that modern neuroscience is based on two tenets: 1) the brain is organised into specific functional areas, 2) the factors distinguishing one functional area from the next, and indeed one brain from the next, are the amount and type

of neurons in each, as well as how the development of the brain has interconnected them. This entails that the firing of these interconnected neurons produces all behaviour, from simple reflexes, to complex mental acts (Kandel et al., 2013:337). The conclusion that can be drawn from this is that it is possible to understand the neural control of any behaviour by first breaking it down into its key components, then by identifying the regions of the brain that correlates with each component and finally to analyse the connections between the implicated regions. Kandel et al. (Kandel et al., 2013:337) reasons that, on these terms, it is relatively simple to understand the complex workings of the brain.

A functional view of the brain and consciousness

In order to understand the biological processes of cognition, Kandel et al. (2013:389) states, it is necessary to consider how information is processed, not only by individual neurons, but throughout neural networks. To accomplish this, it is necessary to incorporate methods and approaches from both cellular and systems neuroscience, as well as cognitive psychology. One such cognitive process is summarized as follows:

> "The anterior regions of the parietal lobe contain elementary internal representations[91] of the body surface and peripersonal space that can be modified by experience. [92] Analysis of such modifications in the posterior parietal association cortex indicates that selective attention[93] is a factor in integrating the internal representation of the body with perception of extrapersonal space. The representation of the body is integrated with the representation of actual, imagined, or remembered visual space, and self-consciousness

[91] An internal representation is a certain pattern of neural activity with at least two aspects: 1) a pattern of activation within a certain neuron population and 2) a pattern of firing in individual cells.

[92] These experiences may include any form of movement, e.g. walking, falling, jumping etc.

[93] Selective attention in visual perception is deemed the most elementary manifestation of consciousness (Kandel et al., 2013:18)

functions within this integrated representation" (2013:389)

With this example of self-conscious action in mind, it is highly likely, that, just as spatial experience can take on many different forms, there may be more than one form of consciousness, each with its own distinct neural representation. This statement alludes to the distinction between primary (core) consciousness, and higher-order (extended) consciousness (Kandel et al., 2013:389).

- Primary consciousness is explained as and awareness of objects in the world and the ability to formulate mental images of them. This form of consciousness are shared between all relatives of the primate family and even some other vertebrate animals.

- Higher-order consciousness, contrary to primary consciousness, involves being conscious of being conscious. It is a form of consciousness that is uniquely human and facilitates the formulation of a conceptual understanding of past and future. This ability allows one to think on the consequences of one's action and feelings.

In light of this, Francis Crick and Christof Koch (cf. Crick & Koch, 1990) attempted to develop a coherent reductionist approach to consciousness studies. They began with Freud's contention that most mental functions are unconsciously conducted. Freud posited that our unconscious mental life cannot be deemed a single process, but comprises of three separate components: implicit, dynamic and preconscious unconscious[94] (Kandel et al., 2013:383). The implication of this argument was a bottom-up view of moving from neural action to conscious action.[95] Although contributing to a reductionist view of the conscious self, it does pose a problem for the

[94] The implicit unconscious includes the type of memory responsible for perceptual learning as well as learning motor skills. The dynamic unconscious is the type of mental activity that involves repressed thoughts, sexual and aggressive urges as well as conflict. The preconscious unconscious is the most readily available part of the unconscious, with regards to the conscious mind, and is primarily concerned with planning and organizing immediate actions.

[95] For an argument from higher-order (complex) causation, please see Thompson & Varela 2001.

concept of free will and what the nature of free will would be on these terms (cf. Tibor, 2011:153).

Conclusion

Although a multitude of important elements of this specific model have not been described due to the constraints of the scope of this study – e.g. how the brain produces language, thought, affect and learning, how behaviour emerges during the development of the brain, the influences of and implications for other research fields etc. – it is this researcher's contention that the primacy of neural action in behaviour and consciousness can be deemed the fundamental principle thereof. In light of this study, this fact categorizes the model with what has been described in chapters three and four as the reductionist and positivist views respectively. This will be taken into consideration under section 5.6.

5.5. Towards a Contemporary Understanding of the Foundational Principles of Reformed Theology

Bultmann (1973:9f) describes theology as a "perennial human task." He calls the human person a "theologizing animal", in that one tries to rationalize all the facets of experience that point to a meaning beyond the visible and material reality. For this reason it is of paramount importance to include a discussion of theology in this study, especially when contemplating the nature of humanity's relation to itself and the reality of which the human person is a part of.

The choice of using a reformed theological model within this study is grounded on the basis of the very unique context within which reformed theology is done, and a reformed Christian religion is experienced. Heyns and Jonker (1974:242) distinguish reformed theology from Roman Catholic (RC) theology on the basis of their respective understandings about how one receives salvation/justification. The RC church profess salvation, in essence, to be dependent on the believer's works - whether participation in the seven sacraments or charity (cf. Meiring,

1973:69).[96] [97] The reformed tradition declares a person to be sanctified through faith and by the grace of God alone (cf. McGrath, 2011:358ff).[98]

On these grounds it is clear that the distinction between the two traditions rest upon their respective views of how Scripture informs theological thought – most notably, the doctrine of justification. Heyns and Jonker (1974:242-248) summarize the different views as follows:

- Within the RC tradition the Scripture is viewed as the infallible source of teachings about the faith. The Scripture takes an inferior stance behind the primacy of the tradition however, as it merely enforces the certainty about the salvific nature of the sacraments (Heyns and Jonker, p. 242). Faith, as the belief in the infallibility of the Scripture, plays the role of preparing the believer for the salvation that is acquired through partaking of the sacraments and/or doing charity (cf. Dulles, 2011:98). In terms of its theology, the RC church endeavours to rationalize their beliefs through mental activity, which inevitably leads to metaphysical and speculative reasoning (This can be attributed to the Augustinian, Thomistic and Neo-scholastic approaches being the most influential

[96] This entails the baptism, confirmation, Eucharist, penance, anointing of the sick, matrimony and holy orders. McGrath explains that the sacraments are seen as superficial signs of the invisible grace of God (2011:365).

[97] The RC church does affirm that no one can be justified without faith (cf. Dulles, 2011:96), but "to affirm the necessity of faith is not to affirm its sufficiency" (Dulles, 2011:98) – the RC doctrine of justification has a very strong connection with James' teaching, that faith without works is dead faith (James 2:17), and Paul stating that only through the works of love, can faith avail salvation (Galatians 5:6).

[98] The researcher is aware that there has been conversation and development on an ecumenical level between the RC church and the reformed churches since Heyns and Jonker's work regarding justification, most notably the *Joint Declaration on the Doctrine of Justification* (1999). However, it is evident that an accord has not yet been struck and that protestant theologians are still finding troubling ambiguities in the RC position (cf. Eilers & Strobel, 2014:98).

traditions withing RC theology [cf. Fiorenza, 2011:6]). Thus the theologian is the person that spends his time contemplating theological questions, that seeks to know and analyse in order to build a comprehensive thought-system (Heyns and Jonker, p. 244).[99]

- The reformed tradition, in contrast,[100] proclaims that belief in the truth of the scriptural[101] account of salvation is the sole premise of the doctrine of salvation (Heyns and Jonker, p. 242). Hence, the scriptural account of salvation becomes something entirely existential, as opposed to an objective description of how salvation is to be acquired (Heyns and Jonker, p. 243).[102] God, and not the church, gives salvation on account of God's mercy and not the actions of the believer. On these grounds, the reformed church "wants to be a church of the Word", for people who want to listen to God's Word and whom finds their sanctity within it. In terms of its theology, the reformed tradition endeavours to preach the Word responsibly (cf. Helm, 2014:1). Thus, theology has a hermeneutic function (cf. Van Huyssteen, 1988b:214). The primary goal of theology is to ask the question of how we may gain knowledge about God, ourselves and our relationship with God. For this there will never be a static answer, on the contrary, it will remain a process of constant

[99] Naturally this can be seen as one perspective that would most certainly merit some challenges. The researcher is however merely delineating Heyns and Jonker's argument, as it contributes to the rest of the study.

[100] Helm posits that there are those who, from the perspective of reformed orthodoxy, would term the classical view of the reformed tradition as "catholic protestantism" (2014:1). The reason lies therein that basic strands of theological thought could be detected throughout these two traditions. Hence, to pit reformed theology over and against RC theology cannot be viewed as an absolute contrast.

[101] Sproul posits that reformed theology is systematic, in that it tries to understand doctrine in a unified and coherent manner. It does not seek to impose a particular philosophical system on the Bible, but to discover and define a system that is taught by the Scriptures themselves (1997:23).

[102] This is because salvation is believed to be received by personal faith alone, and is seen as the restoration of a relationship as opposed to the healing of a "sin-sick soul" (Eilers & Strobel, 2014:97).

engagement. In light of this, it is argued that theology loses sight of itself when it wants to engage in metaphysical and speculative reasoning.

One of the core tenets of the reformed tradition that is the concept of *ecclesia semper reformanda est* (the church is always to be reformed) (cf. Mahlmann, 2010:382). This stems from the responsibility of theology to speak into the concrete lives of people. Wentzel van Huyssteen (1998b:214) acknowledges "the epistemically crucial role of interpreted experience, and the way that tradition shapes the values that inform our reflection about God and what some of us believe to be God's presence in the world." For these reasons this researcher believes that an engagement with neurotheolgy – as another field that seeks to gain knowledge about humans and their relationship to ultimate reality – will be particularly meaningful if it is done from a reformed theological perspective.

5.5.1. Defining the task of Reformed Theology

We speak about God "*non ut diceretur sed ne taceretur*" (not in order to define but because it is not possible just to say nothing) – Augustine (in Bultmann, 1973:10)

Migliore (2004:1) explains that there are a considerable number of different views about the the task of theology. Some contend that its task is to clearly describe Christian doctrine (cf. Erickson, 2013:8), while others are of the mind that it should translate the Christian faith into intelligible terms for the wider culture (cf. Davaney, 2014:26). For others it just provides a certain perspective for thinking about important issues. Lastly there are still others who contend that theology should be a reflection on practicing the Christian faith within oppressed communities (cf Fiorenza & Galvin, 2011:323).[103]

What is evident in all of these views, Migliore finds, is the fact that faith and inquiry are inseparable when thinking about the task of theology. In the same vein Anselm of Canterbury

[103] Fiorenza distinguishes between the academic task of theology – to be historically accurate, conceptually rigorous, systematically consistent and interpretively clear – and the task in relation to providing guidance for faith (2011:3).

said that theology can be described as *fides quaerens intellectum* (faith seeking understanding). Lesslie Newbigin (1995:4) articulates his endorsement of this view in stating that faith in the incarnation of Christ – the unification of spirit and flesh – should enable the theologian to engage the world he/she lives in theologically. God became human and therefore created a lasting bond between our reality and God's. Thus, faith can be seen as a way to knowledge – of God and oneself – through interaction with God's world. Thus, faith is not the end of knowledge in itself.[104] This is in accordance with what Heyns and Jonker (1974:128) regard as the starting point of theology, namely, knowledge of God. [105] Knowledge of God is attained not only by asking the 'what' questions (e.g., what is God's relation to God? A Trinitarian relationship), but also the 'how' (or why) questions (e.g., how is God understood as three persons).

The point this researcher is making, is that the reformed theological tradition encourages theologians to ask the difficult questions and not to 'cop out' by giving easy answers. It implores them to engage with other fields of knowledge for the possibility of more informed engagement with reality. It consequently admonishes a foundationalist or nonfoundationalist[106] stance toward the faith as an easy way out of dealing with concrete reality, as it becomes clear the reality can be described and spoken of by more than one worldview.

In light of the above, a reformed approach to theology can best be described as the critical justification of faith (Van Huyssteen, 1989b). It seems that Migliore (2004:2) would agree with this description of theology in stating that "theology is not mere repetition of traditional

[104] This is an important statement due to the personal and experiential elements inherent in how faith is received and expressed. Faith is not contained in abstract thought and dogma, but in a lived experience.

[105] They state that the starting point for gaining knowledge of God is the Bible (Heyns and Jonker (1974:128).

[106] Van Huyssteen (1998a:214) describes foundationalism as the classical objectivist view of theology, and nonfoundationalism as the opposite side of this coin in that each theology relies solely on its own confessional uniqueness (in other words, contextual objectivist theology).

doctrines but a persistent search for the truth to which they point and which they only partially and brokenly express. As continuing inquiry, the spirit of theology is interrogative rather that doctrinaire; it presupposes a readiness to question and to be questioned." A theological view such as this needs to inform how the Biblical text – as the primary source of knowledge about God and one's relationship with God – should be read and understood by theologians. A secondary element that needs to be implicated by this view of theology is how extra-Biblical truth – about God and one's relationship with God – is sought.[107]

5.5.2. Theology as the critical justification of faith

"Somewhere between the modern and the postmodern, a safe place exists—a place ... where reason rules but does not tyrannize, where we enjoy the temperate gains of the postmodern without suffering its extremes" – (Joseph Bottum, in Van Huyssteen, 1998b:213)

Van Huyssteen deduces that, for theologians to account for their faith critically, they must be prepared to reflect on their own processes of thought. This, he argues, burdens them with the fundamental task of relating the essential nature of their faith to the question of the very nature of rationality (1989b:xii). This task relates to the system of rational reflection as delineated by contemporary philosophy of science. Van Huyssteen (1989b:186) correspondingly describes this task as a balancing act for the theologian, between the vital truths of the Christian tradition on the one hand – which are derived from the central Biblical message[108] -- and what he calls "the complex but ineluctable challenge of contemporary thought and problem-consciousness," on the

[107] 'Truth', in this sense, is taken to denote 'complete knowledge' of God and one's relationship towards God. Knowledge, however, is not gained by mental activity alone; song, confession, rejoicing, suffering, prayer and action are all contributors to this knowledge (in summary, as noted previously, knowledge is gained by a lived experience). Migliore (2004:7) points out that this is because the understanding that is sought by faith, is wisdom that illuminates life and practice, and not speculative knowledge.

[108] The message, as Van Huyssteen describes it, of God's saving grace through the crucifixion of His Son, Jesus of Nazareth (1989b:186)

other. In other words, the task of theology is to find a relation between the truths mediated through tradition, and the concrete context of the theologian.

This task challenges the theologian, that seeks to give a critical account his/her faith, with the query whether rationality can regain a place in theology.[109] When questions of rationality reclaim a foothold in theological reflection, they are specifically aimed at the foundation of theology – i.e. what are the principles and theories that underline the foundations of a theological model? – and thus extremely important for interdisciplinary discourse. These questions, Van Huyssteen states, are in effect asking about methodology (1982:43). This consequently implicates the object of study and, as a consequence, the justification of theological claims as well. In other words, how do we go about gaining knowledge of God, through God's revelation, as the object of theological reflection?

On these grounds we beg the question: can all of these elements be integrated into a system that will hold its own against the contemporary philosophy of science? Van Huyssteen (1982:45) gives a description of the minimum requirements for a rational and critical theological model, as put forth by the report of the Dutch Reformed Church in the Netherlands (Velema, 1981) about the nature and authority of the Bible:

In theology, Christians (subject) endeavour, in the scientific investigation (method) of God's revelation (object), to make responsible claims about God and the world (truth), in service of the church and community (function).

Drawing from some of Van Huyssteen's writings, criteria for the subject, method and object constituents of the minimum requirements stated above can be made:

[109] Heiko Schulz proposes that religious belief can be, what he terms, "epistemically successful" and thus justified rationally in a pragmatic sense. He describes his criteria for religious beliefs to be epistemically successful as: "whenever and to the extent that they [religious beliefs] express and are rooted in certain experiences to be spelled out as an 'acute spiritual crisis'" (2013:281).

- The subject of theology

Van Huyssteen (1982:52) points out that the believer, as the subject of theology, should reflect in the capacity of standing in relation to both the church and the scientific enterprise. This entails that the theologian should conduct his/her science freely, while still speaking the language of faith, in harmony with a credible and responsible conception of the authority of the Bible. He cautions theologians in this respect to be weary of their *a priori* commitment to God's revelation, and in using it as a rational pretext for developing the theological models irrationally on unexamined premises (1989b:188). The reason for this is that it can be devastating to the credibility of the theologian and may lead to him/her taking refuge in an esoteric epistemology (nonfoundationalist theology)[110] as a means of immunization against criticism. The possibility for the theologian to retain his/her identification with a theological tradition, as well as being able to preserve intellectual integrity, can be produced by accounting for this inherent subjectivity within his/her theorising honestly and responsibly (1982:54).

- The method of theology

"As a science, theology is under the obligation to share its method with other scientific fields; its theories should, as a result, be subject to practical findings."

This statement is taken from the report "God with us" (Velema, 1981, in Van Huyssteen, 1982:55). Van Huyssteen remarks that, if this should be taken as the essential character of theology, we run the risk of reducing it to "Scripture-positivism", and its task solely to exegesis. He is of the opinion that the scientific quality of theological designs entail much more than just method. Likewise, the method of theology is deemed much more than just explicating

[110] This is often the easy option in a post-modernistic climate. Van Huyssteen (2007) responded to this in arguing that hermeneutics (or, epistemic reflection [cf. Van Huyssteen, 1998b:214]) will always need epistemology to guide it and give it credibility.

Scripture.[111] This, says Van Huyssteen, consequently undermines the understanding that science similarly has a relational quality to it (1982:55). Because of this inherent quality, to strive toward a unification-ideal within the spectrum of al sciences will do an injustice to the distinctiveness of theology's rational progress. However, Van Huyssteen argues, to appeal to the object of its study in order to retain methodological distinctiveness, theology could potentially run the risk of being accused of immunizing itself against answering the difficult life questions (1982:56). In this respect the philosophical scientific reflection could contribute to theology in terms of understanding its sphere of influence. Furthermore, it can lend its support so that theology may determine if its claims can be deemed plausible in terms of describing reality, thus answering the question if it qualifies as a hypothesis. The nature and language of theological statements plays a crucial role in this respect, because of the theory- and value-ladenness thereof[112] (Van Huyssteen, 1989b:128).

- The object of theology

God's revelation, as the object of the theological endeavour, is contained foremost within the Bible (special revelation), but God's immanence within reality (general revelation) plays an equally crucial role in theological reflection (Van Huyssteen, 1982:57). This statement raised a problem in the sense that there has been a great deal of controversy among theologians

[111] The theological method propagated by theologians such as Rudolph Bultmann, Paul Tillich, Reinhold Niebuhr, Karl Rahner and Wolfhard Pannenberg, among others, can be characterized as a "careful articulation of theoretical issues arising from contemporary experience" (Pilario, :266). These issues would then be correlated with Christian revelation. This method is similar to that of Van Huyssteen mentioned above.

[112] Van Huyssteen explains this statement by arguing that all Christian statements about God are predicated on experience and the multidimensional framework within which these experiences are interpreted (1989b:129). This alludes to the metaphorical nature of religious statements and why a critical engagement with the Scripture and tradition is of such cardinal interest. See Van Huyssteen (1989b:137) for a comprehensive explanation of the nature and function of theological metaphor.

throughout history about the nature of this revelation. How God's revelation is perceived implicates the manner in which it is taken to be the starting point of theological reflection, especially from the vantage point of the *sola scriptura* (Scripture alone) of the reformation.[113] The proposal Van Huyssteen makes in this respect is to view the Bible as "a book of faith with a radical religious dimension" (1989b:177).[114] As such it is a wide-ranging and complex text that provides written evidence, in religious and metaphoric language, of how believers perceived God in a relational manner. In this respect, Van Huyssteen cautions that "a positive religious encounter with revelation provides no alternative to subjectivism in theology" (1989:189). Thus, the task of the theologian, pertaining to the object of theology, is to attempt to convey the essential message of the Bible with a responsible hermeneutical form of scriptural appeal (1989:189). This is done in order to illuminate the deepest intention of the text, so that it will be able to direct any contextual religious experience (cf. Van Huyssteen, 1989:180). The reason for such precautions rests with the knowledge that the authority of the Scriptures are not received unproblematically. The theologian's interpretation of the Scripture and consequent doctrine problematizes its authority and can therefore not be handled uncritically, otherwise theological language would diminish into a purely expressive language. The final outcome of such uncritical reflection would see theology being reduced to nothing but another form of social ideology (cf. Van Huyssteen, 1989b:189).

In seeking to answer the question of its identity, reformed theology is not obligated to prefer

[113] A fine balance exists between considering the Bible to be the Holy Word of God and just a collection of recorded human experiences of God. Thus, the authority of the Bible comes into question when considering the revelatory nature thereof.

[114] From an entirely different perspective, Van Huyssteen, in his article *Narrative theology: An adequate paradigm for theological reflection?* (1989a), asks the question of what the epistemological status of theological statements can be, when it is based on a fundamentally narrative, and thus metaphorical, discourse? How is truth claims assessed in this respect, and what is the hermeneutical criteria from which good and bad receptions of Christian texts can be distinguished?

theoretical thought to religious experience, as a way to stake a claim regarding rationality. Van Huyssteen posits that the Christian faith itself – how it is experienced and conceptualised – offers grounds for a critical realist reflection and, as such, for rational reflection. He writes that our faith in Jesus might be articulated in statements of faith, but that it is committed to "a network of argumentative constructs" (1989b:189). This, he says, is a critical justification of faith and, for this researcher, means the very essence of reformed theology.

5.5.3. Summary of the criteria for a critical realist theology

Van Huyssteen (1982:45) summarizes his minimum requirements for a credible theological design as follows:

1. The theology must be utterly contextual with regards to the problem consciousness of its time, and thus be able to describe a) the problem and b) its origin systematically.

2. Theology must always be critical theology and as such has a responsibility to justify its faith.

3. The theology – as critical theology – must establish a responsible scientific design: a design that serves as a guide to understand God's revelation for our time.

5.6. How does Newberg's neurotheology relate to cognitive neuroscience and reformed theology.

To streamline this section of the study – especially taking into account the vast amount of different elements that need to be brought into conversation – the researcher will endeavour to create operational definitions for cognitive neuroscience, and neurotheolgy – using only the most relevant elements – in the form of the minimum requirements described in the previous section:

Cognitive Neuroscience:

In cognitive neuroscience, Neuroscientists (subject) endeavour, in the scientific investigation (method) of the human brain and mind (object), to make responsible claims about the origin and

nature of human consciousness and behaviour (truth), in order to better the human condition (function).

Neurotheology:

In neurotheology, neurotheologians (subject) endeavour, in the scientific investigation (method) of the human brain and mind (object), to make responsible claims about the nature of religious, mystical and spiritual experiences (truth), in order to better the human condition (function).

Reformed Theology:

In reformed theology, Christians (subject) endeavour, in the scientific investigation (method) of God's revelation (object), to make responsible claims about God and the world (truth), in service of the church and community (function).

5.6.1. Categorizing cognitive neuroscience and reformed theology

In chapter three we delineated the four perspectives of Brandt (2010), in terms of how proponents of science and theology view neuroscience, i.e. reductionist, religionist, apologetic and integrative. The argument was made that proponents such as Newberg, fits into both the religionist and integrative views, albeit in a somewhat nuanced fashion. In terms of the cognitive neuroscientific model described under section 5.4 above, it would be safe to allocate its proponents to the reductionist view. The reformed theological model described in section 5.5 above is a little harder to place. It is not entirely satisfied with the natural theology of the apologetic view, although it cannot let neuroscience completely reform its fundamental core as is the main trait of the integrative view. Thus, it would be best preserved and articulated in terms of a nuanced position between apologetic and integrative.

In chapter four we delineated the four basic paradigms of inquiry, i.e. positivist, postpositivist, critical theory and the constructivist/pragmatic paradigm. Neurotheology, as Newberg describes it, was found as unequivocally constructivist/pragmatic. In terms of how the cognitive neuroscientific model was described, it should most certainly be placed within the postpositivistic paradigm. The reformed theological model, again, is somewhat difficult to place on account of

its position on the revelation of God. It cannot stand for a fully fledged subjectivist view of reality since some objectivity does remain. Although, because of the inherent element of experience in speaking about God, it could be placed within the range of the epistemologies of critical theory and constructivism. Ontologically it could be fairly easily placed in either the postpositivist or critical paradigm, on account of its belief in a real reality, but simultaneously a nascent reality. Methodologically, because of its contextual, relational and scientific character, it takes from all the different paradigms: dialogue, dialectic, hermeneutics and experimental. With this in mind, and for want of a placement, reformed theology would fit into a nuanced critical theory paradigm, as it is not intrinsically pragmatic or positivistic.

At the beginning of this chapter we delineated four different views on the possible interaction between science and religion. Neurotheology has been placed in a nuanced position between dialogue and integration. It is somewhat difficult to place the cognitive neuroscientific model, as it is indeed possible that different proponents of the same field may take up different views toward this subject. A further variable to consider when making a choice from a scientific perspective is the specific theology in question. When all is taken into account, and the specific theology is the reformed theology as described above, at worst an independent view could be assumed. It is this researcher's contention that, if cognitive neuroscience is practiced responsibly, no less that a dialogical interaction may be accepted – especially when taking the limit questions and methodological parallels into account. The reformed theology could also be placed within this dialogical scope, but an argument can be made for elements of the integration model's natural theology, theology of nature and systematic synthesis inherent therein. As a result it would also be placed in between both models.

5.6.2. To what extent can Reformed theology and cognitive neuroscience relate to Newberg's Neurotheology?

> Personhood cannot be explained in isolation; nor can the phenomenon of mind and consciousness. – (Du Toit, 2007:293)

As neutral as Newberg would like to be – as a pragmatist/constructivist and as an integrationist

– it is just not possible to effectively integrate two paradigmatically unique fields into a cohesive whole without fundamentally altering or mutilating one or both of them. The origingal question has been: what would neurotheology have to prove in order to illicit a paradigm-shift for either neuroscience, theology or both? This is exactly the point. A paradigm-shift, as discussed in chapter one (p. 1), alters the fundamental beliefs of its proponents' worldview, due to the amalgamation of anomalies within its current system until no amount of ad hoc theories could support its legitimacy any more. This is not yet the case for either the positivist cognitive neuroscience or critical reformed theology.

As a reformed theologian, the first problem this researcher has with the study of RMS experiences, that endeavours to assign a specific direction to the causal arrow, is based on the message of Hebrews 11:1 "Now faith is the assurance of things hoped for, the conviction of things not seen."[115] The Christian faith is predicated on belief in the mystery of God. God is not a mental construct, nor is faith born of knowledge, [116] but it is a gift from God and a relationship with God.[117] This is the starting point of the reformed theologian's interaction with neurotheolgy. It also sets the parameters for further interaction.

A second concern theologians have with neurotheology, is its understanding of theology itself. Jeftic (2013:274) argues that although there can only be one neurology,[118] by no means can there be only one theology. Newberg's aspirations toward a meta- and megatheology seeks to unite all

[115] New Revised Standard Version, 1996 .

[116] Newbigin argues that faith is a way to knowledge, through a relationship with Jesus Christ – it is not an objective source of knowledge (1995:1ff).

[117] Lane comments on Hebrews 11:1 and the consequent verses by drawing our attention to this declaration of faith as "the quintessence of all that the writer wished to affirm about the intensity and capacity of faith through a catalogue of attested witnesses" (1998:328). Hence, faith is confessional by nature and springs from a very direct and personal encounter with the living God (1998:329).

[118] He uses the example that there is no Islamic neurology or Buddhist neurology, just neurology.

religions and theologies in one seamless model. Within this model all differences and contradictions are explained away as the products of different operators within the brain and mind that need not distinguish or exclude them from each other.[119] However, Jeftic (2013:274) asks, how can the statements "Christ is God" and "Christ is not God" be deemed an illusory difference? Thus he concludes that, just as there are no universal theology, there should be no universal neurotheology.

Thus, neurotheology would be better suited as either 1) a component of theology, or 2) a component of neuroscience.[120] In the first instance, neurotheology would be the mouthpiece of theology[121] when dealing with the neurosciences, without attempting to construe a universal theology in order to become acceptable to all of them. In the second instance neurotheology, although still a misleading term in terms of its understanding of theology, will concern itself with the neurological aspects of RMS phenomena. The findings may even prove beneficial to both theology and neuroscience.

The focus on religious experience is the next problem to consider. Jeftic argues that Newberg deems a concrete neurological experience as the centre of any RMS phenomenon, i.e. prayer, doctrine, meditation etc. (2013:275). As has been noted in the critique in chapter three, it is impossible to consider RMS experience as a category of neurological experience. Likewise it is impossible to explain religion in its totality by means of neurological processes. Thus, neurotheological hermeneutics is problematic on the account that the perception of RMS

[119] Neuotheology might be beter suited in giving direction as to how different doctrines may coexist, as opposed to forcing them together on account of their exclusivity being a mental illusion (cf. Jeftic, 2013:274).

[120] One specific reason for the neurosciences to reject being amalgamated by neurotheolgy is voiced as follows: "the purpose of science is not to fulfil people's religious needs but to gain knowledge about the universe and to build the great edifice of empirical knowledge" (Capra et al., 1992:39)

[121] Each theology would have its own neurotheological counterpart, not a universal one.

experiences is taken as its central point. Theory, derived from experience opens the field up to free speculation (cf. Jeftic, 2013:275). As has described in chapter two, Newberg bases his theories off of the functioning of the nine cognitive operators – these operators may function in a dominant or absolute fashion. Jeftic (2013:275) comments on this by stating: "…the most complex theories are reduced to the results of domination of a specific cognitive function while this domination is reduced to a specific form of religious-intellectual experience (the flash of insight)." When factoring in the influence subjectivity and emotion may have in both the inquirer and the experience of the subject of the inquiry, this way of producing theories is indeed anomalous.

Lastly, this researcher agrees with Jeftic (2013:275) that Newberg's persistence in arguing for an integration of neuroscience and theology is one of his endeavour's biggest inadequacies. Such a reckless integration would be detrimental to science and theology both, in that it burdens science with the abstract nature of theological reflection, and likewise burdening theology with a research model where its claims have to be subject to experimental falsifiability.[122] The extent of this scenario – theology bound to the scientific paradigm – would mean that theology must reinvent its core principles every time a paradigm-shift occurs.

In light of the above, it seems that the only way Newberg's neurotheology might be deemed acceptable by its constituent parts is by adhering to the following criteria:

1. By operating exclusively within the framework of theology or science by informing its theory and practice, rather than transforming it.

2. By accepting that the neurological experience present in RMS phenomena may be unique, but it is not universal. Thus, accepting the unacceptability of a meta or megatheology.

3. By accepting that not all RMS phenomena can be explained through the prism of

[122] Jeftic (2013:276) gives an extreme example, where the grace of the Holy Spirit will have to be subject to measurement by a PET scan for prayer to be a viable practice.

experience. This is doing an injustice to the proponents view of the complexity of RMS phenomena.

4. Finally, that it rather endeavours to facilitate a dialogue between its scientific and religious counterparts, with the intent of fostering mutual reconsideration.

It is this researcher's contention, in accordance with that of Jeftic (2013:276), that if neurotheology can be beholden to these criteria, it might prove to be of considerable use to the neuroscientific and theological enterprises.

5.7. Conclusion

In the beginning of this chapter some remarks were made regarding the title questions of this study, i.e. what scientific and who's theological understanding is Newberg referring to when using the term 'neurotheology'? It has been shown that he perpetuates the relevancy of his model for neurotheology on the argument that it has value for the respective research fields of both neuroscience and theology. Furthermore he posits that it could also facilitate an integration between the two fields. In this chapter it was the aim of the researcher to evaluate the possibility of both these contentions of Newberg's neurotheology – first on the grounds of its integrational prospects, and second in terms of how it could relates to neuroscience and theology. Thus it was necessary to articulate Newberg's unique use and understanding of science and theology in an interactive capacity, as well as arguing the merits of two contemporary models for neuroscience and theology, respectively, with which to evaluate Newberg's model.

It was shown that his model's facilitation of interaction between science and religion could best be described as dialogical-integrative. Dialogical on the account that it does not presume to be able to answer the boundary questions by using the scientific method, thus admitting that theology has an authentic contribution to make to science. It is also integrational on the account that, as Barbour described a theology of nature, it takes both science and religion seriously, although Newberg believes that science should inform theology on a fundamental level.

This chapter discussed some of the foundational principles of a contemporary neuroscience and

theology as well:

The main focus of neuroscience is on its study and understanding of how the brain is related to behaviour and consciousness. It was shown that a strong reductionist approach is in effect, where all behaviour is linked to the actions of neurons and neuronal systems, and that consciousness has an emergent function driven by a movement from the unconscious apprehension of reality onward to full consciousness. In both these cases a bottom-up approach is posited.

The main focus of the theology expounded upon was summarized by three criteria: theology should always be contextual, should always justify its faith responsibly and it should endeavour to establish a scientific design that serves as a guide to understand God's revelation for our time. The *a priori* assumption of this theology is the reality of God's existence and the fact that God reveals God's will to us in our concrete existence.

In light of these descriptions of neuroscience and theology, it was suggested that Newberg's neurotheology, in its currant form, will only be able to act as a counterpart/informant to either neuroscience or theology. Hence it will not be able to facilitate an integration without seriously damaging the unique task, beliefs and other characteristics of both fields.

Looking toward the next chapter it is now possible to conclude this study and engage the research questions the researcher set out to answer.

Chapter 6 – General Conclusion

"If theology is critical reflection on the life and thought of the religious community, the context of theology is always the worshipping community. Religious experience, story, and ritual are the starting points for articulating doctrines and beliefs." – Barbour (1997:328)

The Redeeming God is the starting point of the biblical tradition. Through confrontation and solidarity with historical events the Christian community has found rejuvenation and wholeness. Here people have come to know the release from guilt, insecurity, anxiety and despair. They have experienced the power of reconciliation, as it pertains to estrangement within their worldly relationships, as well as their relationship with God. This paved the way for an understanding of repentance and forgiveness, facilitating the possibility of a new self-understanding, leading to the development of a capacity for love – radically leading them away from self-centredness. This can only be the content of confession (it cannot be tested clinically), that through Christ something has happened in their lives that opens up new existential possibilities. This is the power of the "new creation" in Christ; He is the image of the fullness of the created order, as well as the manifestation of creation in continuance. Through Christ, God is encountered in a concrete fashion throughout history – in creative personal and societal renewal, and by redeeming grace.

However, the argument has been made that, although theology starts from Biblical/historical revelation and personal experience (section 5.2 and 5.5.2), it cannot stand outside of the natural order. Nature remains the stage for God's redemptive action – thus there is a continuity between nature and grace (cf. Barbour, 1997:329), between speaking about nature (impersonal) and speaking about God (personal). The Bible indeed declares that God is the Lord over all of creation – thus God is both creator and redeemer. God is the transcendent, determining, self-limiting, immanent, creative participant in the cosmic narrative (Barbour, 1997:329ff). All of this populates the hermeneutic lens through which Christians perceive reality in one way or another.

It was with all this in mind that the researcher sought to contribute by engaging Andrew Newberg and his neurotheology. As a reformed theologian that is aware of the intensely personal nature

of religion, the dangers of dealing with religion by making statements in an uncritical or unnuanced fashion seemed evident. The scientific study of RMS experiences – which is believed by their subjects to have a transcendent nature to some extent – stands the chance to draw misguided inferences from the results.

Thus, it was necessary to lay bare the scientific and theological assumptions that drives Newberg's neurotheological project and give rise to his neurotheological statements – the question this study asks is: with what science and who's theology is Newberg making statements, and to what extent (if any) do these statements influence science and theology? By accomplishing this, it could serve as a framework for scientific and theological communities when entering into conversation with Newberg. This study has sought to facilitate such a conversation between cognitive neuroscience and critical reformed theology, using this framework. Below is an outline of how this was done:

Chapter one introduced the study, pointing out the problem explained above, identifying the research questions and the research methodology that would shape the study in the successive chapters.

In chapter two a comprehensive, though not exhaustive, description of Newberg's neurotheology was given. Special focus was placed specifically on the goals he has set for neurotheology, the underlying principles that drive him toward fulfilling these goals, as well the neurophysiological and –psychological structures and systems that Newberg constructs his principles from (section 2.2-2.4). His position toward all of Ian Barbour's four interaction models (section 2.3.1) with regard to the possible role neurotheology can fulfil within each has been explicated, as well as determining that the integration interaction model is his model of choice, though this remained to be critically engaged.

Chapter three described the four possible positions that Pierre-Yves Brandt (2013) proposed can be taken with regards to neurotheology, namely, reductionist, religionist, apologist and integrationist (section 3.2 and 3.3). Newberg was categorized as a religionist-integrationist with a few subtle nuances. Some of the main critiques of Newberg's neurotheology within this chapter

were explicated, and can be summarized as follows: his experientialism leaves the inquirer in epistemological isolation, his theory is deemed problematic on account of inductive reasoning, acceptable categories for the neurological experiences of RMS have not been sufficiently advocated and lastly, the neuroscientific methodology he uses is at best somewhat problematic for the types of inferences he draws from them.

In chapter four the basic paradigms of inquiry – positivism, postpositivism, critical theory and constructivism – were described (section 4..2.1), as well as how these relate to qualitative and quantitative research. From this description, lines were drawn toward an understanding of mixed-method research, delineating al the possible shapes such research can assume. Newberg's neurotheological project was placed within the constructivist paradigm (section 4.5), also known as pragmatism, and consequently deemed a mixed-method research paradigm.

Chapter five laid out Ian Barbour's description of four possible interaction models for science and theology, i.e. conflicting, independent, dialogical, integrational (section 5.2). As a result, Newberg's neurotheology could be placed within this framework and evaluated. It was deemed as most representative of a nuanced collaboration between a dialogical and integrative approach. Cognitive neuroscience (section 5.4) and reformed theology (section 5.5) were similarly delineated in terms of an operational model. They were also categorized with regards to the different frameworks given in chapters three, four and five. Lastly a discussion was presented on the possible relation neurotheology could have toward neuroscience and theology, wherein criteria for possible fruitful interaction were given (section 5.6).

6.1. Answering the research questions

1. How, and to what extent, does cognitive neuroscience and critical reformed theology critique Andrew Newberg's neurotheological model?

Chapter three has taken the most direct approach with regards to critiquing Newberg's model in this regard. However, considering all that has been said within this study, Newberg's paradigmatic approach certainly foresees the most difficulties in being accepted 'as is' by both neuroscience or theology respectively. Neither neuroscience nor theology can condone a

relativist ontology or a subjectivist epistemology (cf. section 3.4 and 4.5). For neuroscience reality can be discovered for what it is to a certain extent, and for theology reality – especially when regarding God's revelatory action (both special and general) – was made an important beacon for reflection through the incarnation of Christ.

2. Within which paradigm of inquiry is Andrew Newberg constructing his model for a neurotheological integration of science and religion? Is it predominantly quantitative (neuroscientifically orientated), qualitative (theologically orientated), or a seamlessly integrated mixed-method?

After due consideration of paradigm-theory, Newberg has been placed within the mixed-method paradigm (section 4.5). Although, it is not always the case that he gives equal amounts of consideration toward neuroscience and theology (quantitative and qualitative fields) – sometimes his research is qualitatively dominant and at other times quantitatively dominant. This is the result of his constructivist/pragmatic research tendencies, in which case it would be most fitting to assign him to a nuanced position within the mixed-method paradigm.

3. To what extent can neuroscience and reformed theology engage with Neurotheology, without having to make a paradigm-shift?

In terms of its paradigmatic underpinnings and interactional potential, neurotheology – as Andrew Newberg employs it – has been deemed an acceptable counterpart, working alongside either the neurosciences or theology, respectively, in a dialogical and informing capacity (section 5.6.2). The provision, in this respect, is that some of its basic tenets and aspirations must be revised, on account of lacking credible justification and discrediting the fundamental characteristics of is constituent research fields.

6.2. Limitations and further study

The researcher is aware of the fact that the assumptions, proposals and answers articulated within this study are subject to his interpretive framework. Furthermore he does not claim to have taken every and all noteworthy authors or opinions into account, or even exhausted the

opinions of the cited authors. He does, however, propose to have been as objective and responsible as possible in dealing with the information presented, and to have offered a clear and credible engagement with the research problem by means of the research questions.

For further study:

In light of the four criteria given under section 5.6., some possibilities opens up for further study. If the proposal is adhered to – that neurotheology should operate exclusively within one of its constituent fields – the need arises for the establishment of possible relationship parameters of a theology-neurotheology, or neuroscience-neurotheology partnership. These parameters would have to facilitate the possibility of dialogue, with the intent of mutual reconsideration. This would challenge both scientists and theologians to broaden the scope of variables to be taken into account in their respective reflections. This should not only be done with regards to the technical discrepancies between these fields, but also to challenge Christians to revaluate the way they view humanity and how humanity is situated in the natural order – as psychosomatic beings, over and against the lingering Cartesian dualism. The realization of being a part of nature and concretely situated within the natural order may consequently inspire humanity to cultivate a greater ecological conscience. Furthermore, such a conscience might contribute in fostering altruistic behaviour among people, when they realise that we are part of nature in a collective fashion. Correspondingly, when the inherent value of creation can be grasped, it may foster a deeper respect and admiration for nature, and counter the desperate need some Christians have to be redeemed from this earth.

With regards to the the problem of the *causal arrow,* as it pertains to RMS experiences – reformed theology pointing the causal arrow in the direction of Devine action and neuroscience pointing it in the direction of mental function – it would be interesting to see how the contemporary Christian views of how God interacts with the world, comments on the study of RMS experiences. Indeed, insights from other religious traditions could broaden the scope of such a study considerably. Contributions from authors such as Nancy Murphy, George Ellis, Keith Ward, Michael Heller etc., who contemplates the scientific possibilities for Devine action – in terms of quantum uncertainty (bottom-up), or inspiring events by wilfully interacting with

complex systems (top-down) – could contribute considerably to this discussion. As was discussed, some people – both scientists and theologians – are too adamant in their beliefs about causality. From the Christian side, gaps in scientific explanation would readily be filled with God's action (God-of-the-gaps), but the opposite is also true, that anything but a scientific explanation is dismissed to fill the knowledge gaps (science-of-the-gaps).

Lastly, attempts have been made recently to create a neuroscientific account of ethics – this is a product of the neuroscientific endeavour to create a unified theory of the brain. It is the contention of the researcher, however, that a responsible neurotheological approach to ethics – unifying ethical Scriptural principles with insights from neurobiology and neuropsychology – could benefit both theological en *secular* reflection regarding ethics.

> "Religion, whatever it is, is a man's total reaction upon life, so why not say that any total reaction upon life is a religion? Total reactions are different from casual reactions, and total attitudes are different from usual or professional attitudes. To get at them you must go behind the foreground of existence and reach down to that curious sense of the whole residual cosmos as an everlasting presence, intimate or alien, terrible or amusing, lovable or odious, which in some degree every one possesses." – (James, 1902/1936:35)

It can be said that the theologian, neuroscientist and neurotheologian, all endeavour to express and articulate their total reaction upon life as best they can, with the methods at their disposal. The time for absolutist claims and unwavering faith in the truth of a singular worldview has been unmasked for the problematic nature of its naiveté. Thus, conversation between these unique *total reactions* is vital for a more contoured and textured understanding of the reality we are all a part of.

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